November 1944

THE FOUNDRY

FIFTY-THIRD YEAR

TECHNOLOGY DE
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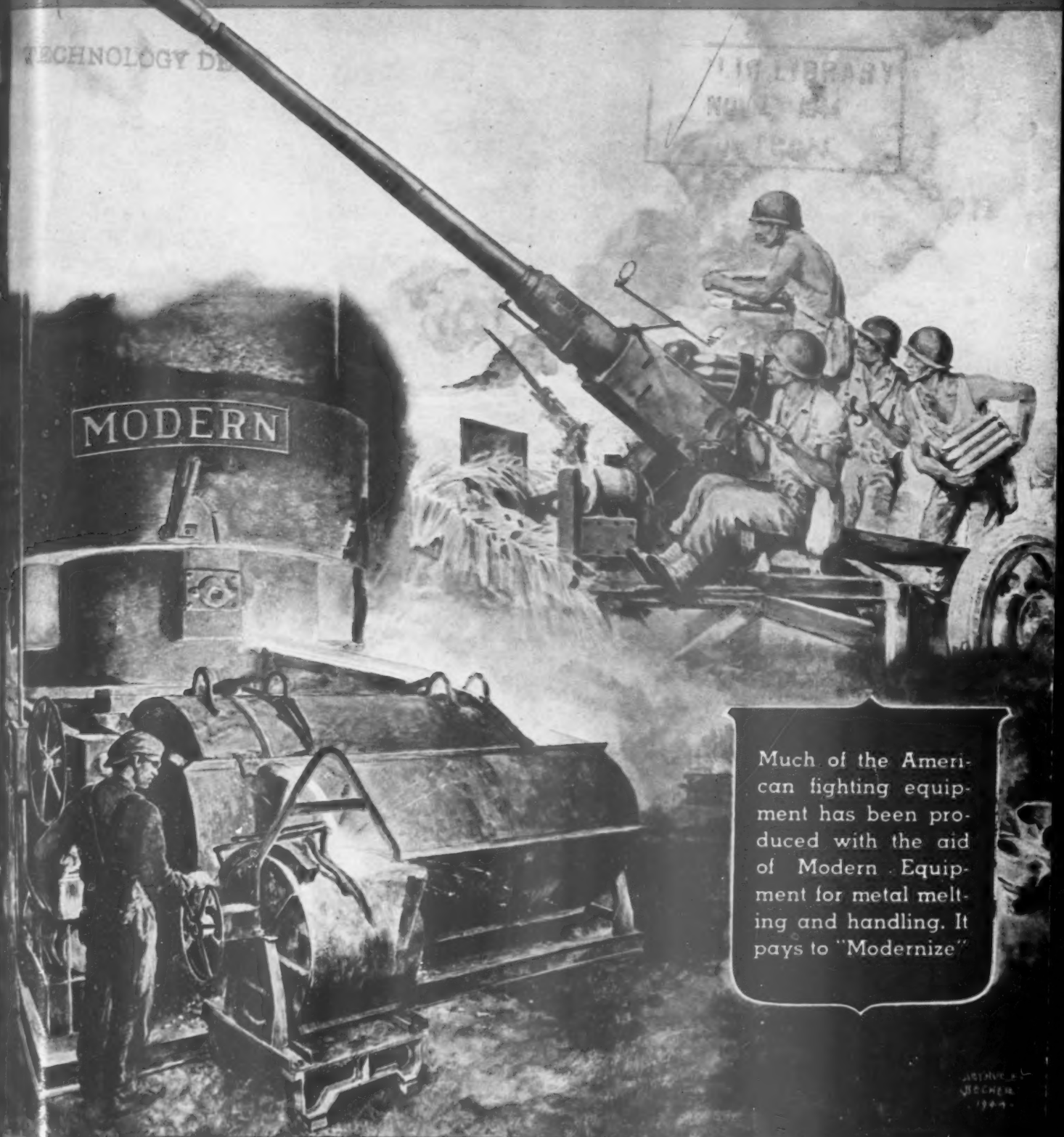

Much of the American fighting equipment has been produced with the aid of Modern Equipment for metal melting and handling. It pays to "Modernize"

Cupolas • Cupola Chargers • Covered & Insulated Ladles • Lifetime Geared Ladles •
Improved Bottom Pour Ladles • Metal Pouring Systems • Crane & Monorail Systems
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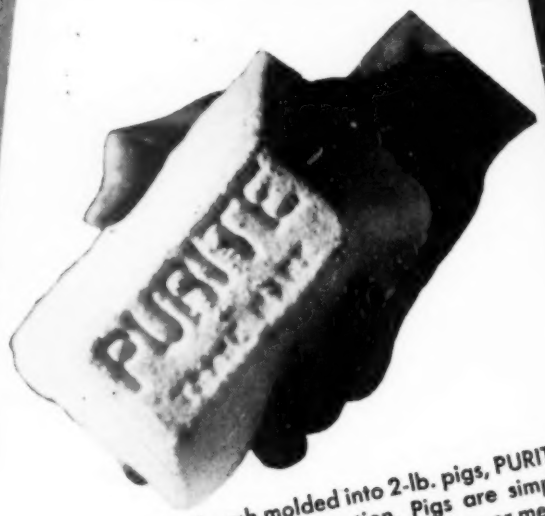

99% pure fused soda ash molded into 2-lb. pigs, PURITE is easy-to-use and effective in action. Pigs are simply added to ladle or cupola by count. No weighing or measuring. No loss or dust. PURITE is safe and economical to use.

SHIPPED IN 100-LB. BAGS AND BULK CARLOADS

IMPROVE STRENGTH and MACHINABILITY OF CASTINGS

For better cupola operations with hotter metal and less oxidation of the iron and metalloids in the charge, use Purite. This scientific flux removes impurities and prevents segregation defects. In both cupola and ladle, Purite increases the fluidity and pouring qualities of the molten metal, speeding production of sounder castings.

Ask your foundry supply house for a copy of Mathieson Bulletin P-41, "Refining and Desulphurizing Cupola Iron with Purite."

PURITE

99% PURE FUSED SODA ASH

THE SCIENTIFIC FLUX FOR BETTER MELTING & CLEANER IRON

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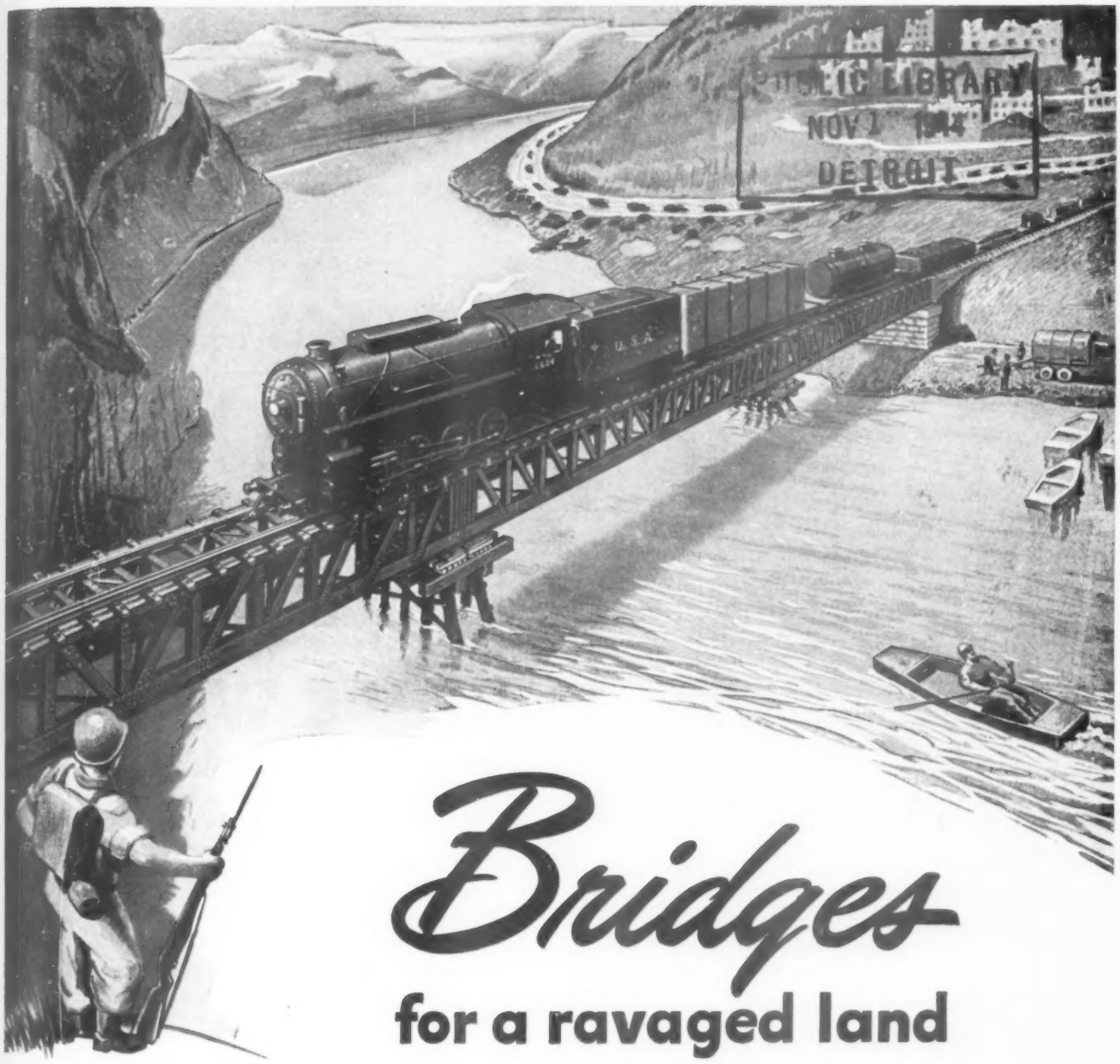

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NOV 1 1944
DETROIT

Bridges for a ravaged land

In the wake of the retreating Nazi horde, wrecked European railways are being restored to service as rapidly as possible. The British, who are handling this job in western Europe, designed steel spans, made up of interchangeable parts held together by pins and bolts, to serve as emergency bridges. A single span may extend to 85 feet; longer bridges may of course be constructed using intermediate piers.

The Unit Construction Railway Bridge, as the span is called, was first used in North Africa, where it won the approval of U. S. Army engineers. Now Bethlehem's Fabricated Steel Construction organization is shouldering the major part of the task of mass-producing these knock-down bridges—nearly 1,000 spans, and 250 sets of spare parts, totalling 50,000 tons.

To make the bridges quick and easy to assemble, yet thoroughly dependable in service, the parts must fit together with much greater accuracy than is needed in ordinary riveted-bridge construction.

The holes which receive the pins or bolts must be accurately centered, to within 1/1000 of an inch; of accurate diameter to within 8/1000 of an inch; and the pins and bolts themselves must be machined with a leeway of no more than 5/1000 of an inch.

Granted that these are "temporary" structures. Yet their substantial nature, and the state of things in ravaged Europe, suggest that the bridges may be giving useful service for a long while to come.

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★ BETHLEHEM STEEL ★

SECOND LARGEST STEEL PRODUCER

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FAST—Green Bond is fast. It blends with sand so quickly that it's the ideal bentonite for use in today's high-speed mullers. Uniform grind makes it fast. For real speed, it's Federal Green Bond.

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THE FOUNDRY

for NOVEMBER 1944

VOLUME 72 NUMBER 11

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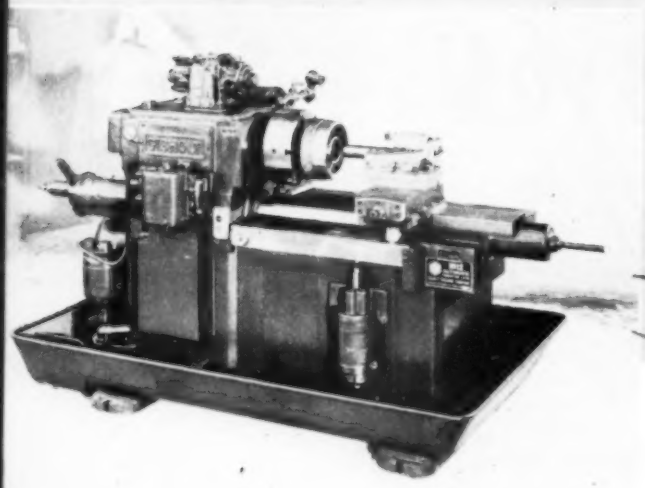
RUN LINOIL KEEP GAS

Dependable Uniformity

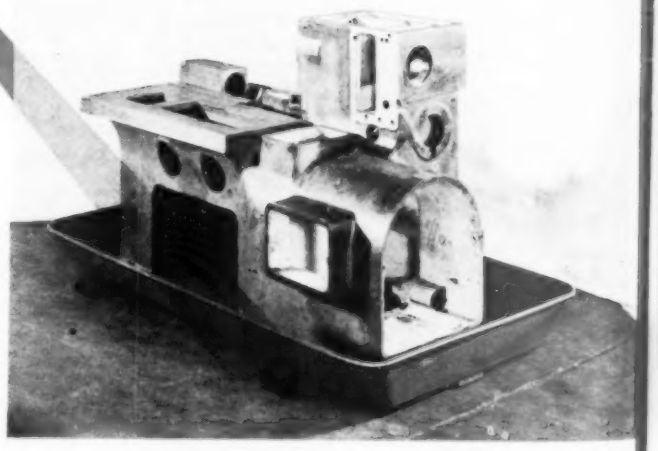


GISHOLT MACHINE COMPANY MADISON WIS.

LINOIL

THERE must be enough oil to give a core strength for handling and for doing its work in the mold, but one speck more oil than the needed minimum is bad. This applies even to Linoil—small gas producer as it is.

The foundryman who cannot trust absolutely the uniformity of his core oil must habitually stay far enough away from the outer edge to play safe. That means more dried oil in the core than is absolutely necessary and dried oil in combustion is gas—gas right where you do not want it.



The uniformity of Linoil allows you to run your sand ratio out to the extreme limit of serviceability and hold i there in safety. There is no variation in the strength or in any other of th factors that makes Linoil good. The saving of oil is a minor matter; it is th saving of castings that counts. This is one of the reasons you should use Linoi

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(DIVISION OF ARCHER-

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Makes Extreme Limits Safe Practice

GISHOLT MACHINE COMPANY

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Gentlemen:

Here at the Gisholt foundry we like Linoil, -- have used it for years.

It can be run in high ratios, it bakes out thoroughly, produces very little gas, and works smoothly in the core boxes.

We employ a number of women core makers and they like Linoil because it does not stain their hands.

We have always found Linoil to be uniform in quality.

Yours very truly,

Arnold J. Salg

Arnold J. Salg
Asst. Foundry Superintendent

AJS:ME

Arnold J. Salg, Asst. Foundry Superintendent and a Set of the Linoil Cores Used in Casting Bed of the No. 12 Hydraulic Automatic Lathe.

The No. 12 Hydraulic Automatic Lathe is one of a complete line of lathes and balancing machines manufactured by Gisholt. Some weigh up to 26,000 pounds assembled. The No. 12 Lathe is 5,500 pounds assembled, the bed casting weighs 2,800 pounds and 3,000 pounds of Linoil cores are used in casting the bed.

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**Trade mark of Pangborn Corporation for airless blast cleaning.*

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WORLD'S LARGEST MANUFACTURER OF BLAST CLEANING AND DUST CONTROL EQUIPMENT

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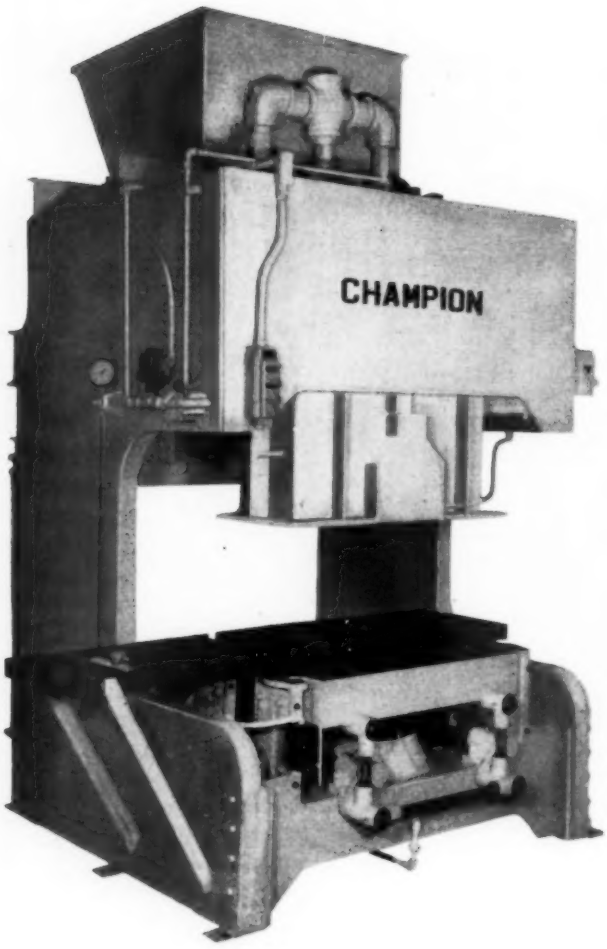
NOW'S THE TIME TO DO SOME

CHAMPION INVITES YOU TO SEE HOW BETTER

NOT JUST 1 MODEL—O



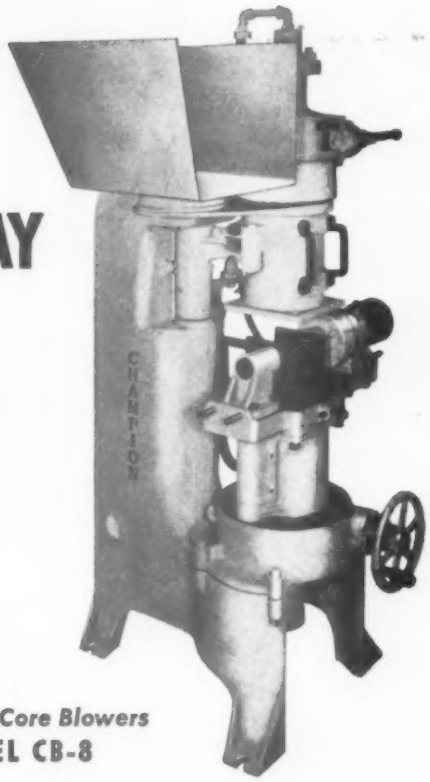
Champion Core Blowers
MODEL CB-400

Champion Core Blowers
MODEL CB-12

CHAMPION FOUNDRY
1318 W. 21st STREET

G ABOUT CORE BLOWERS
S ARE MADE THE CHAMPION-WAY

VEN 2—BUT 4!



Champion Core Blowers
MODEL CB-8

And 4 great *Champions* they are; each tried and proved in many of the world's leading foundries, small and large.

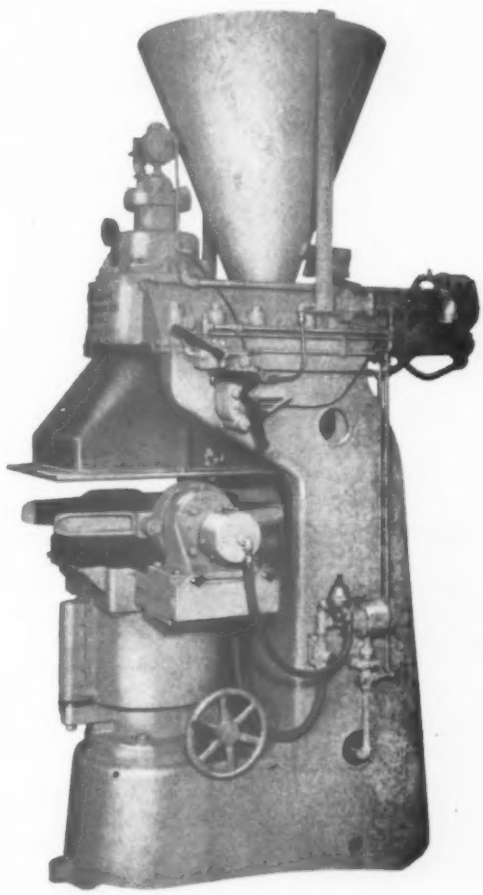
These 4 great *Champions* represent 47 years of foundry "know how". They were designed, built and proved by foundrymen for foundrymen. That is why *Champion* guarantees 100% satisfaction from every *Champion* installation.

That is why, without previous experience, any man or woman—boy or girl can produce perfectly rammed cores on a *Champion* Core Blower by merely setting the box and pulling the lever. A single valve operates the core box clamp, clamps same against the blow plate, blows the core, exhausts and releases the clamps in the proper cycle.

Regardless of core size or design—small or large, simple or complex—the ramming time is identical for every core. That is why *Champion's* foundry "know how" has played such an important role in the production of uniformly accurate cores the *Champion-Way*.

Today, *Champion's* advanced design is helping to meet the most difficult production schedules. Tomorrow, they will do their bit to meet post-war competition and earn real profits for the foundries of America.

It's always wise to string along with the *Champion*.



Champion
Core Blowers
MODEL CB-15

ACHINE COMPANY
CHICAGO, 8, ILLINOIS

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NUT SHELL PARTING

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PARTEX is a superfine waterproofed powder made from pulverized nut shells. It contains no hazardous, nor harmful ingredients. It flows like water, dusts freely through a shaker bag and covers all surfaces uniformly. PARTEX has the properties and characteristics of Lycopodium at only a fraction of the cost.

PARTEX works FASTER, SAVES TIME, and LASTS LONGER. Core boxes and patterns STAY CLEANER with FEWER APPLICATIONS. PARTEX has uniform surface affinity for sand. It will not pile up in corners. It is non-reactive with molten metals and will not pit, nor etch metal patterns and core boxes. PARTEX will not contaminate nor change the characteristics of core and molding sands. PARTEX is easier and safer and more economical to use.

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It's Plasti-Lastic—For all Types of Sand Cast Metals

For STEEL
DELTA STEELKOAT
DELTA SPECIAL CORE & MOLD WASH

For GREY IRON & MALLEABLE
DELTA GRAKOAT DELTA BLACKOAT

For NON-FERROUS METALS
DELTA NON-FERRUSKOAT

Prove to yourself the superiority of PARTEX (Nut Shell Parting). A liberal sample will be sent to you on request.

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DELTA SAND CONDITIONING OILS
DELTA CHILLKOAT

Fisher Furnaces, George Adler Foundry, Cleveland, Ohio

Melting Room Modernization has ceased to be a mere choice of equipment by trade name and capacity. Modernization today—as strongly emphasized by war's drastic demands and to be further emphasized when serious competition returns—is a scientific study demanding answers developed from experience. Conservation of labor, fuel and material, which is essentially the only answer to competitively lower costs and maximum profits, begins with plant layout organization and careful analysis of the specific production job to be accomplished. Coping with such problems from the word "Go", including the engineering of the plant layout, recommendations for the proper equipment for the specific application, coordination of the equipment to the individual requirement, as well as the building of the equipment, have long been the specialty of Fisher Engineers. Prime consideration to faster melting, longest crucible and refractory life, minimum supervision and maintenance, and lowest fuel consumption is a requisite and proved feature in every Fisher Furnace. The Fisher Line of Furnaces includes models for sand casting, die casting, permanent mold, holding, alloying, melt-down and smelting. Consult Fisher or the Fisher Representative in your locality for complete details on what this service and experience can mean to your modernization program. Write for Bulletins No. 550 and No. 600 if you have not received your copy.

5519 N. WOLCOTT AVENUE, CHICAGO 40, ILLINOIS

Fisher FURNACE COMPANY

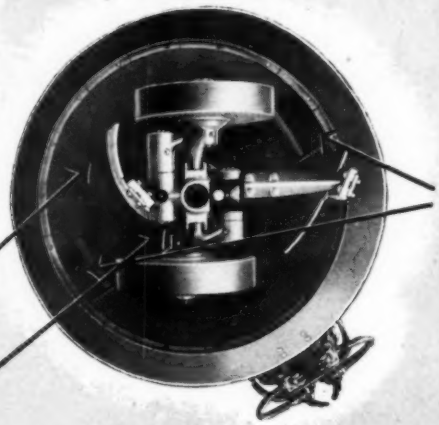
Engineers and Manufacturers

SIMPSON MIXERS—the foundation

No. 4 of a Series

WHAT MAKES THE SIMPSON MIXER BETTE

CRIB, PAN AND DISCHARG



AUTOMATIC RAPID DISCHARGE SAVES POWER

AVAILABLE WITH 1, 2 OR 3 DISCHARGE DOORS

STATIONARY PAN FOR TRUE MULLING POWER SAVING

EASY MAINTENANCE OF WEARPLATES

1 STATIONARY PAN—FOR TRUE MULLING . . .

The pan on Simpson Mixers is stationary because revolution of the pan interferes with the forward and sliding action of the mullers—so necessary to uniform rapid mixing and mulling.

2 HIGH CRIB FOR FLEXIBILE CAPACITY . . .

Simpson Construction permits temporary overloading to maintain production during peak sand requirements. This is possible because sand will not spill over the edge of the Simpson's high crib, thereby allowing some flexibility of capacity.

3 STATIONARY PAN FOR POWER SAVINGS . . .

One-third to one-half less power is needed to operate a Simpson than most mixers. In a Simpson, the load is not being carried or plowed through but merely worked on by the mullers which move over it. Simple, efficient, and an important factor in low mixing costs.

4 EASY MAINTENANCE OF WEARPLATES . .

The wearplates, which form the pan of the Simpso Mixer, are made in quarters or halves so that replac ment can be made without dismantling the entire mix assembly. Both the wearplates and the crib are of hig carbon steel, found by test to be best for durability an mixing results.

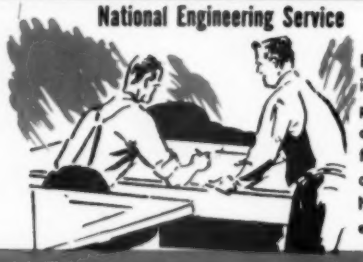
5 SAFETY OF OPERATION . . .

No special guards or safety devices are needed on Simpson installation. For moving mullers are guarde by the stationary crib. No moving parts are expose when the mixer is operating. Gearing is protecte manual shoveling and cleaning is not generally require

6 AUTOMATIC AND RAPID DISCHARGE . .

The discharge door, located in the base plate, is leve operated and opens the bottom of the pan, allowin sand to be automatically discharged by the action the plows in from ten to thirty seconds. This gravi method of emptying is fast, sure, safe and economica

National Engineering Service



For more than 30 years National Engineering and Field Service, has helped hundreds of foundries solve problems in sand preparation, reclamation, handling, storage and control. Today, National Engineers are constantly on the job helping foundries with problems of sand handling and control on construction, maintenance, repair or new requirements. National Engineering and Field Service is available and eager to help you whenever and wherever you need it.

National Field Service

better sand control . . .

6 more

REASONS WHY THOUSANDS OF SIMPSONS ARE IN USE IN FOUNDRIES TODAY!

HERE are six more reasons why practical foundrymen prefer Simpson Mixers: 1. Stationary pan for true mulling; 2. High crib for flexible capacity; 3. Stationary pan for power savings; 4. Easy maintenance of wearplates; 5. Safety of operation; 6. Automatic and effortless discharge. The important advantages of these features are apparent—look over some of their details at the left.

They, together with the advantages of the other component parts of Simpson Mixers, previously pointed out, produce the better, faster, less costly mixing that makes Simpsons the choice in four out of every five new installations.

If your sand control job calls for a new mixer—this month, next month, or many months from now—remember that a Simpson is your best bet. For the purpose in life at National is to help you properly condition sand at the *lowest net cost per ton*. Simpson Mixers have been, are now and will always be . . . designed and built from the foundryman's point of view, with his problems uppermost in mind. Simpson users will tell you they profit by this National policy. So can you.

WRITE FOR NEW SAND CONTROL HANDBOOK

The new 64-page, generously illustrated Simpson Handbook presents the complete story of better sand control and Simpson Mixers. If you do not have a copy, write for one today. You'll find it a valuable and highly informative book. There is no obligation, of course.

ARMY (E) NAVY

Our Army-Navy Production Award flag now has a white star for continued production achievement.

NATIONAL ENGINEERING COMPANY

MACHINERY HALL BUILDING • CHICAGO 6, ILLINOIS

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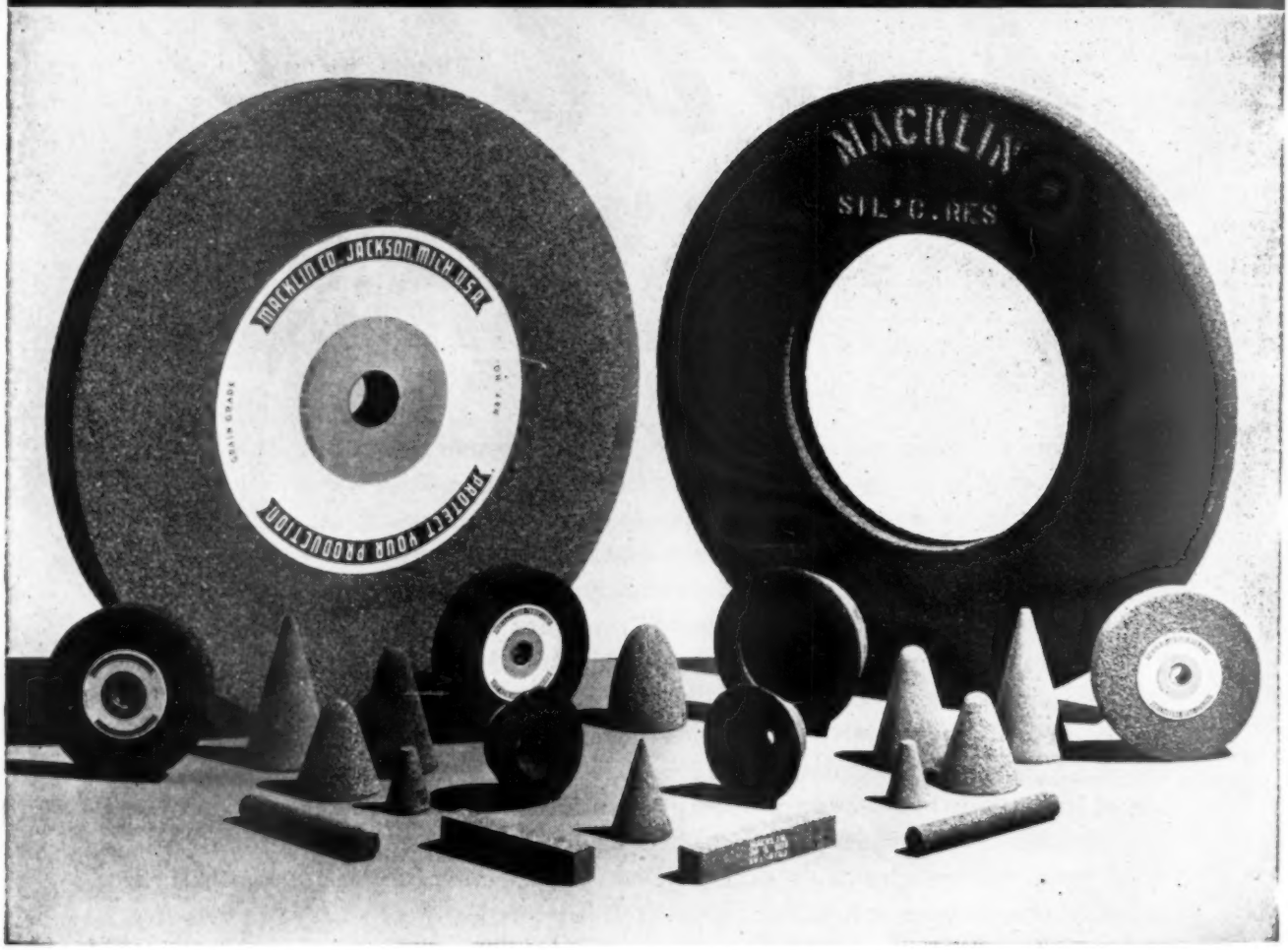
MACKLIN GRINDING WHEELS



FOUNDRIES, large and small, require grinding wheels in many sizes, shapes, grains and grade combinations.

Macklin Company is thoroughly equipped to produce high quality grinding wheels for all foundry requirements.

No matter what your grinding problems may be there is a Macklin wheel to fit the job that will "Protect Your Production."

Ask for the services of a Macklin Field Engineer.

Invest in War Bonds

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Pin-Up Chart

FOR FOUNDRY MEN!

... Select the Vancoram Ferro-Alloy best suited to your casting requirements

The opportunity for foundry men becomes bigger with each passing day. Now is the time to capitalize on the growing use of alloyed steels and irons.

The all-important features of wear resistance, higher tensile strengths, greater hardenability, and other desirable physical properties all favor increased use of alloyed castings in new applications and design trends.

A member of our Engineering Staff is always available for consultation without obligation. VANADIUM CORPORATION OF AMERICA, 420 Lexington Avenue, New York 17, New York.

VANCORAM BRAND

FERRO ALLOYS AND METALS

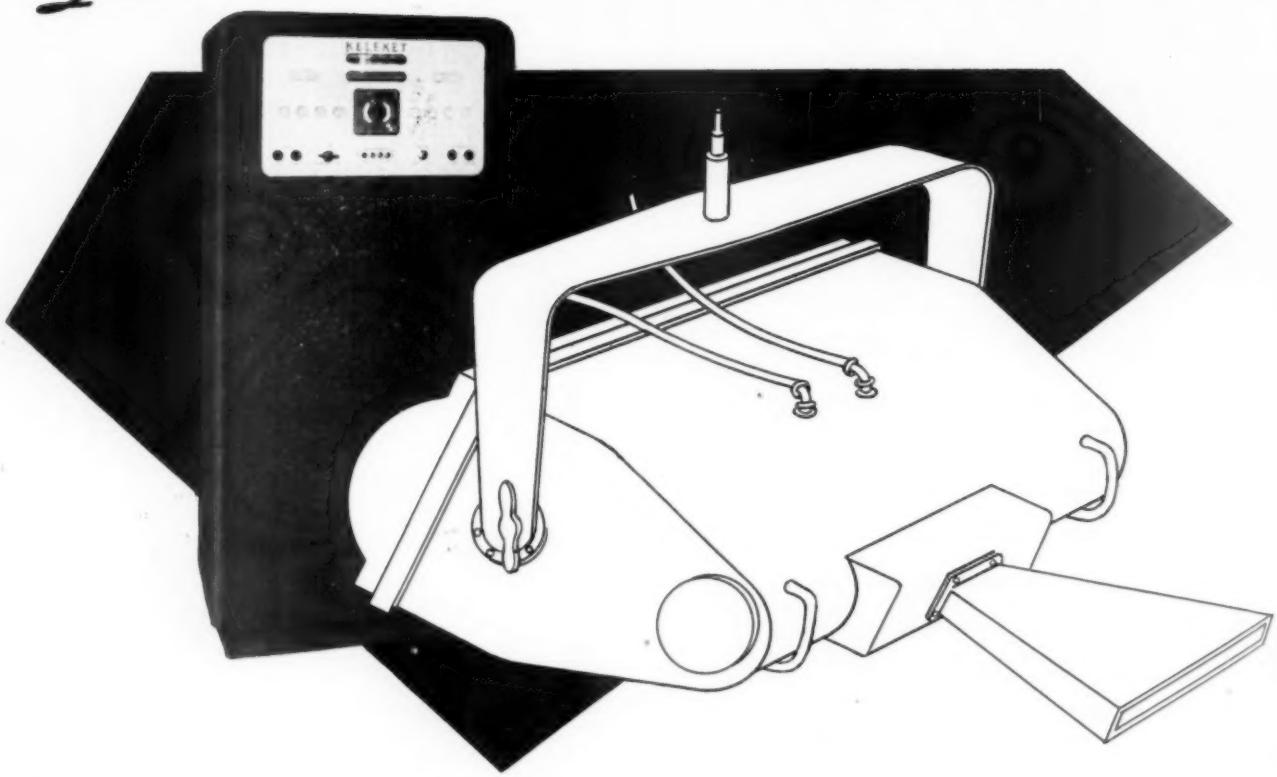
VANCORAM ALLOYS

PRODUCTS	NOMINAL COMPOSITION	APPLICATIONS
ALSIFER	Aluminum.....20% Silicon.....40% Iron.....40%	Used principally as a steel deoxidizer and for grain size control.
GRAINAL ALLOYS (Vanadium Grainal #1)	Titanium.....15% Aluminum.....10% Vanadium.....25% Boron.....0.20%	A new series of intensifying alloys that present a practical and economical means for controlling and increasing the capacity of steels and for improving other important engineering and physical properties.
(Vanadium Grainal #6)	Titanium.....20% Aluminum.....12% Vanadium.....13% Boron.....0.20%	As above
(Grainal #79)	Titanium.....20% Aluminum.....13% Zirconium.....4% Manganese.....8% Boron.....0.50% Silicon....5% max.	As above
FERRO-CHROMIUM (High Carbon Grade)	Chromium..66-70% Carbon.....4-6%	For steel and iron castings.
(Iron Foundry Grade)	Chromium..62-66% Carbon.....4-8% Silicon 6-9%	For alloyed cast irons. Readily soluble as a ladle addition at lower cast iron temperatures.
(Low Carbon Grade)	Chromium..67-72% Carbon .06%, .10%, .15%, .20%, .50%, 1.00%, and 2.00% max.	For low carbon chromium steels, particularly those with high chromium content, such as stainless and heat resistant types.
FERRO-SILICON (25-30% Grade)	Silicon.....25-30%	For deoxidizing of open hearth steels. Also used for high silicon, corrosion-resistant iron castings.
(50% Grade)	Silicon.....47-52%	An active deoxidizer for steels. Added, pulverized, to ladle in cast irons for silicon content and graphitization control.
(75% Grade)	Silicon.. ..74-79%	For high content silicon steels ... principally sheets of high magnetic qualities. Added to ladle in smaller quantity than 50% type.
(High Silicon Grades) 80-85% 85-90% 90-95%	 Silicon....80-84.9% Silicon....85-89.9% Silicon.....90-95%	For high content silicon steels, where small ladle additions are desirable.
FERRO-TITANIUM (High Carbon Grade)	Titanium...15-18% Carbon.....6-8%	A final ladle addition to control the "rimming" action and the cleansing of effervescing steel. Also used as a final deoxidizer and scavenger in producing steel castings.
(Low Carbon) (40% Grade)	Titanium..38 - 43% Carbon..0.10% max. Silicon . 4.00% max. Aluminum 8.00% max.	Used principally to control intergranular corrosion in corrosion resisting steels, both cast and wrought. Also used for deoxidation of special casting and forging steels.
(Low Carbon) (20-25% Grade)	Titanium...20-25% Carbon.0.10% max. Silicon..4.00% max. Aluminum 3.50% max.	Similar uses to 40% grade, especially for control of intergranular corrosion in cases where low ratio of aluminum to titanium is required by composition or practice.
FERRO-VANADIUM (Grade "A"-Open Hearth)	Vanadium...35-40% Silicon...12% max. Carbon .3.50% max.	Used to furnish low percentage Vanadium content of rolled, forged or cast constructional steels. Also used in Vanadium cast irons.
(Grade "B"-Crucible)	Vanadium...35-45% Silicon..3.50% max. Carbon .0.50% max.	For tool steels and special steels containing high percentages of Vanadium, in which required limits for carbon and silicon are narrow.
(Grade "C"-Primos)	Vanadium...35-45% Silicon..1.25% max. Carbon .0.20% max.	For tool steels and special steels requiring high percentages of Vanadium and exceptionally low impurity content.
V-FOUNDRY (V-5 Grade)	Chromium..38-42% Silicon.....14-16% Manganese..8-11%	Used in cast irons as ladle addition. Reduces chill, promotes uniformity of structure, increases strength and hardness.
(V-7 Grade)	Chromium..28-32% Silicon.....15-21% Manganese..14-16%	As above
GRAPHIDOX NO. 4	Silicon.....45-50% Titanium....9-11% Calcium.....5-8%	A new alloy for the graphitization of iron. Ladle treatment insures iron with normal graphite, free from dendritic structure; reduces chill; a most efficient inoculant in production of high strength irons.

NOTE: *Special compositions of above alloys are obtainable for special applications. They are supplied in lump, crushed or ground sizes—information upon request. Miscellaneous alloys made to order.*

KELEKET *Introduces to Industry*

The 250 KV X-ray Inspection Unit



More Simple ★ More Dependable ★ More Efficient

Here's an important new industrial X-ray unit that has plenty of power and penetration to cover the widest range of inspection requirements—yet it is the easiest-to-operate X-ray apparatus produced today. Whatever can be done automatically *is* done automatically—the element of human error has been eliminated to the greatest possible extent. The *machine* does *more*—the *operator* does *less*—and *you* get better results.

A self-contained tubehead, with built-in oil cooler, eliminates separate transformers.

Stepless push-button control provides infinite kilovoltage selection.

Power is instantly and automatically shut off at maximum tube rating.

Pilot lights indicate—not only when there is trouble but shows where the trouble is.

Automatic safeguard permits radiation of X-rays only when cooling water is flowing.

Line compensator is adjustable while unit is in operation.

Constant milliamperage provided by inductive filament regulators and filament compensating transformers.

This 250 KV unit can be built into one of KELEKET'S radiographic production cabinets, can be furnished on hand truck, or mounted on either stationary or mobile jib crane.

These and many other individual features make the 250 KV machine the easiest, smoothest-running inspection unit available to Industry today. No other industrial X-ray unit will accomplish as much for you with the simplicity, dependability and efficiency that KELEKET'S 250 offers. Get all details from your KELEKET representative, or write us direct.

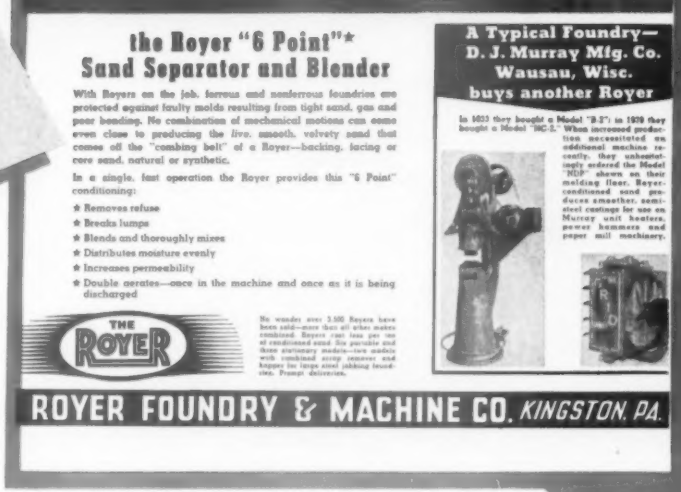
KELLEY-KOETT X-RAY MFG. COMPANY

22711 WEST FOURTH ST., COVINGTON, KY.

PIONEER CREATORS OF QUALITY X-RAY EQUIPMENT SINCE 1900

Still Another Royer for D. J. Murray Mfg. Co.

Reproduced from THE FOUNDRY, November, 1941.



the Royer "6 Point"★ Sand Separator and Blender

With Royers on the job, ferrous and nonferrous foundries are protected against faulty molds resulting from tight sand, gas and poor bonding. No combination of mechanical motions can come even close to producing the *live*, smooth, velvety sand that comes off the "combing belt" of a Royer—backing, facing or core sand, natural or synthetic.

In a single, fast operation the Royer provides this "6 Point" conditioning:

★ Removes refuse
★ Breaks lumps
★ Blends and thoroughly mixes
★ Distributes moisture evenly
★ Increases permeability
★ Double aerates—once in the machine and once as it is being discharged

THE ROYER

No wonder over 3,500 Royers have been sold—more than all other makes combined. Royers cost less per ton of conditioned sand for portable and three stationary models—two models with combined scrap remover and hopper for large sized jobbing foundries. Prompt deliveries.

A Typical Foundry— D. J. Murray Mfg. Co. Wausau, Wisc. buys another Royer

In 1933 they bought a Model "B-2"; in 1939 they bought a Model "NC-2." When increased production necessitated an additional machine recently, they unhesitatingly ordered the Model "NC-2" shown on their molding floor. Royer-conditioned sand produces smoother, semi-steel castings for use on Murray unit heaters, power hammers and paper mill machinery.

ROYER FOUNDRY & MACHINE CO. KINGSTON, PA.

The above advertisement, which appeared in 1941, tells of the Royer Sand Conditioners purchased by the D. J. Murray Manufacturing Company, Wausau, Wisc. in 1933, 1939 and 1941.

This manufacturer of forge hammers, unit heaters and other products has since ordered a Royer Model "NC-2", which is shown at the left.

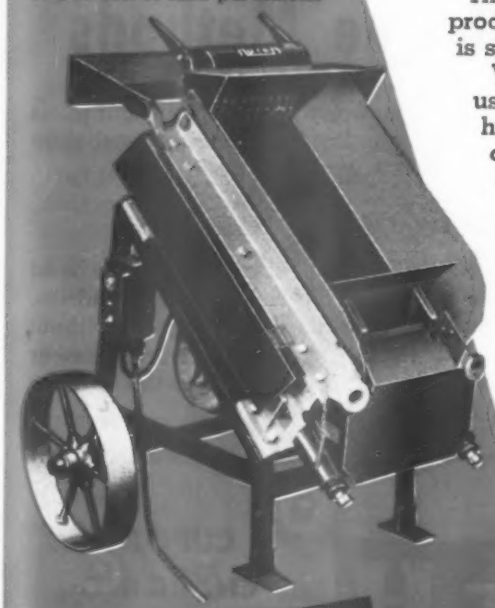
When a piece of equipment is bought for the first time, the user hopes for the best. When he re-orders the equipment has obviously given good performance. But, when he re-orders for the third and fourth time, it means complete satisfaction.

Repeat orders from foundries—ferrous and non-ferrous—jobbing and production—have long constituted a large proportion of Royer purchases.

The Royer advertisement published three years ago is authentic today. The Royer is still the best defense against improperly conditioned sand, and continues to be the only machine that provides "6 point" sand conditioning. Since then, the number of Royers in service has grown from 3,500 to over 6,200.

Royers are sold only by factory-trained sales engineers, with long experience in sand conditioning and molding problems. You can profit by their recommendations.

Royer Model "NC-2", capacity 450 to 550 lbs. of sand per minute.



Write for new Catalog 744, which pictures and describes Royer models for every foundry requirement.

THE ROYER FOUNDRY & MACHINE CO.
KINGSTON, PENNSYLVANIA

FOREMOST IN SAND CONDITIONING EQUIPMENT

Shows New Improvements in Both *Controlled* and *Fixed* Discharge Methods

Which system is best suited to your operation — to help insure highest efficiency in postwar markets? The P&H film showing working installations in two leading foundries will help you decide. Make a note to see this film soon.

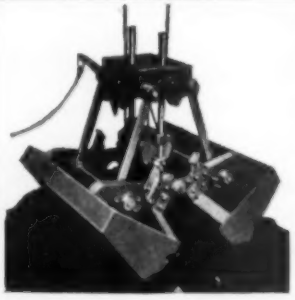
Where much equipment and a lot of re-handling of materials were formerly required, with many men working under difficult conditions, cupola charging is now done with amazing speed and simplicity. In addition to making important savings in manpower and time, finer control of melting and lower cupola maintenance costs are made possible.

Either method, *Controlled* or *Fixed* discharge, is flexible . . . an advantage that allows installation to fit your requirements.

FILM SHOWN ON REQUEST

In 15 minutes, the P&H film shows what improved cupola charging is doing in modern foundries. On request, P&H will gladly arrange — without obligation — for you to see the film and answer all your questions. Just drop a note to the address below.

General Offices: 4405 West National Ave., Milwaukee 14, Wis.



Single Line Grab Buckets for Foundries

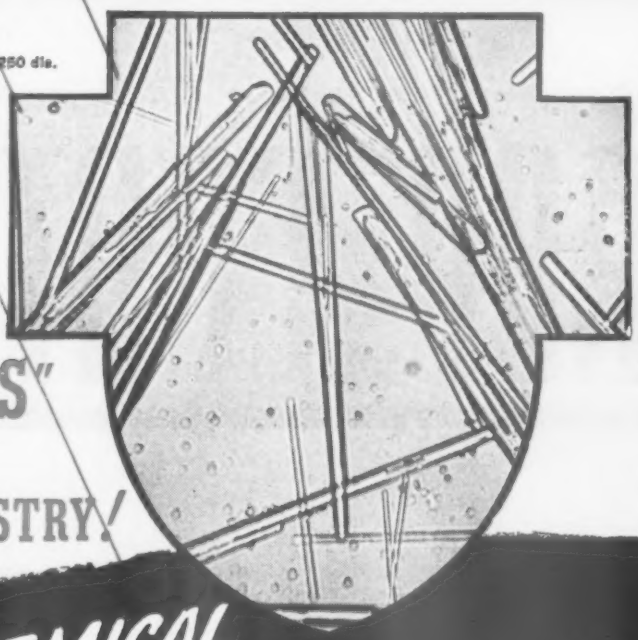
Hang this bucket on a regular crane hook and it's ready to work. No changes in cable reeving are necessary—no complicated hook-ups or switch-over delays. Ideal for handling sand and refuse, digging pits, filling flasks, etc. A real manpower saver. Write for Bulletin C-27.

P&H

CUPOLA CHARGING CRANES

HARNISCHFEGER CORPORATION

ELECTRIC CRANES · EXCAVATORS · ARC WELDERS · P&H · HOISTS · WELDING ELECTRODES · MOTORS



Growing crystals of lead fluoborate—250 dia.

NEW CHEMICAL "TOOLS" FOR AMERICAN INDUSTRY!

METAL FLUOBORATES

- Cadmium Fluoborate
- Chromium Fluoborate
- Copper Fluoborate
- Ferrous (Iron) Fluoborate
- Indium Fluoborate
- Lead Fluoborate
- Nickel Fluoborate
- Silver Fluoborate
- Stannous (Tin) Fluoborate
- Zinc Fluoborate

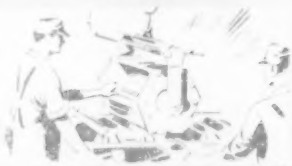
Alkali Group

- Ammonium Fluoborate
- Potassium Fluoborate
- Sodium Fluoborate

GENERAL CHEMICAL METAL FLUOBORATES

Many important products have been developed out of General Chemical's progressive research in fluorides. *Today*—its Metal Fluoborates command considerable attention as new chemical "tools" for electroplaters and metallurgists. *Tomorrow*—the unique properties of these versatile chemical compounds suggest many potential uses whose development is both a challenge and a promise of rich reward to research and industrial chemists interested in electrolytic and metallurgical processes.

Indium and Lead Fluoborate Give Airplane Bearings Longer-Wearing Surfaces.



Metal Fluoborates Efficient in Barrel Plating, too.

Alkali Fluoborates Important in Magnesium and Aluminum Casting.

ELECTROPLATING—Metal Fluoborates are supplied in a concentrated solution form. They require no time to dissolve and dilute quickly with water to the required plating strength! Laboratory tests and commercial applications indicate that the Metal Fluoborates have other outstanding advantages for electroplating, such as high anode and cathode efficiency, good conductivity, high concentration and ease of operation at room temperature.

At present there is a widespread acceptance of lead fluoborate plating baths and an ever-growing use of lead-tin, tin, zinc, cadmium, indium, copper and other Metal Fluoborate solutions.

METALLURGY—Magnesium and aluminum casting has opened a field where alkali fluoborate salts are extremely important. All these salts may find acceptance as fluxes for welding and soldering such metals as silver, gold, stainless steel, nickel, etc. Their further use by metallurgists for heat treating, hardening and other processes can be expected with new developments in the light metal field.

JUST RELEASED!

Important new research data on General Chemical Metal Fluoborates. Includes plating with Lead, Tin, Zinc and Cadmium Fluoborate, etc. Ask for Technical Service Bulletin No. 1015-A.

Copies on request from: Nearest Technical Service Office or General Chemical Company, Fluorine Division, 40 Rector Street, New York 6, N. Y.

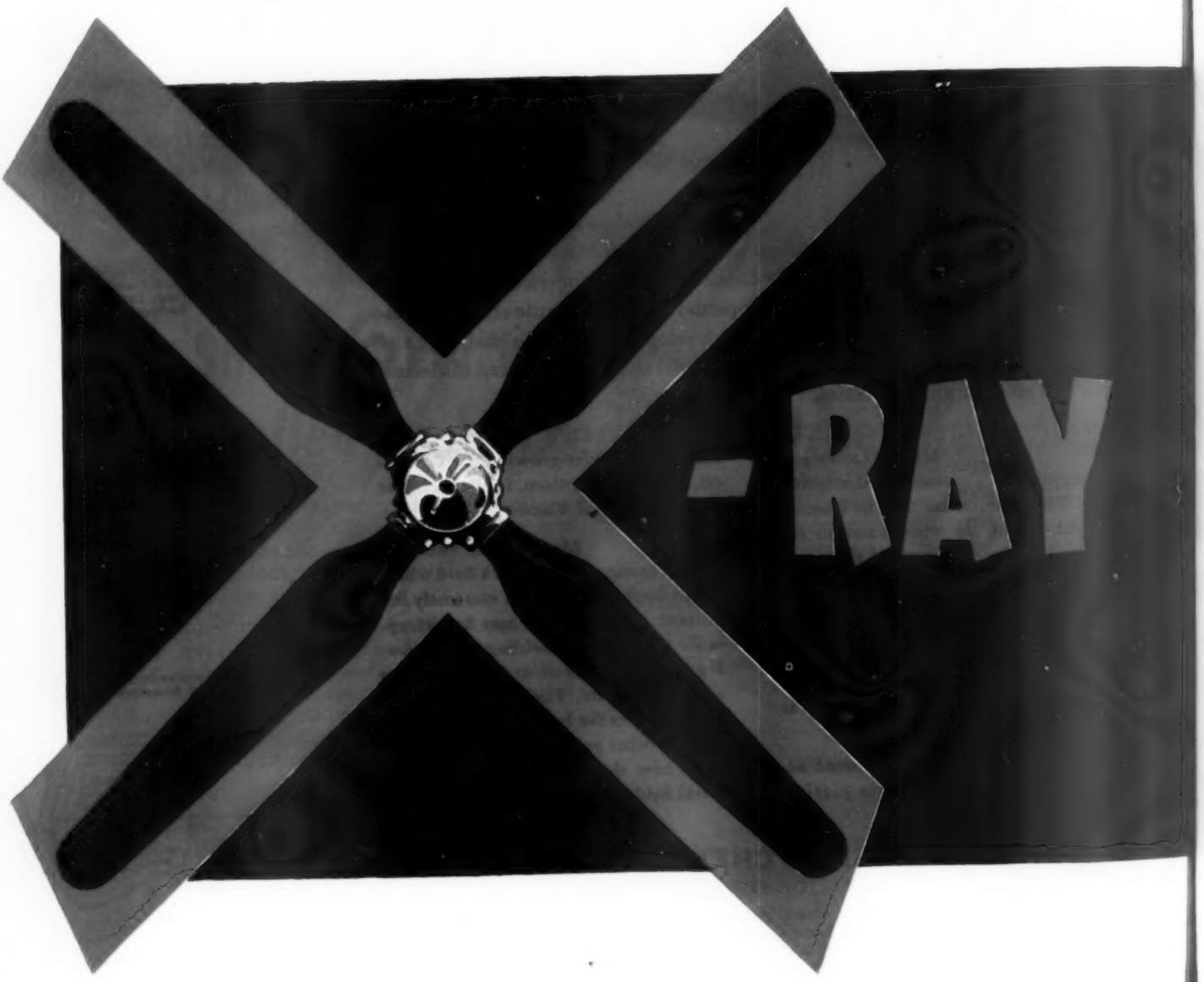
GENERAL CHEMICAL COMPANY
FIRST IN FLUORIDES

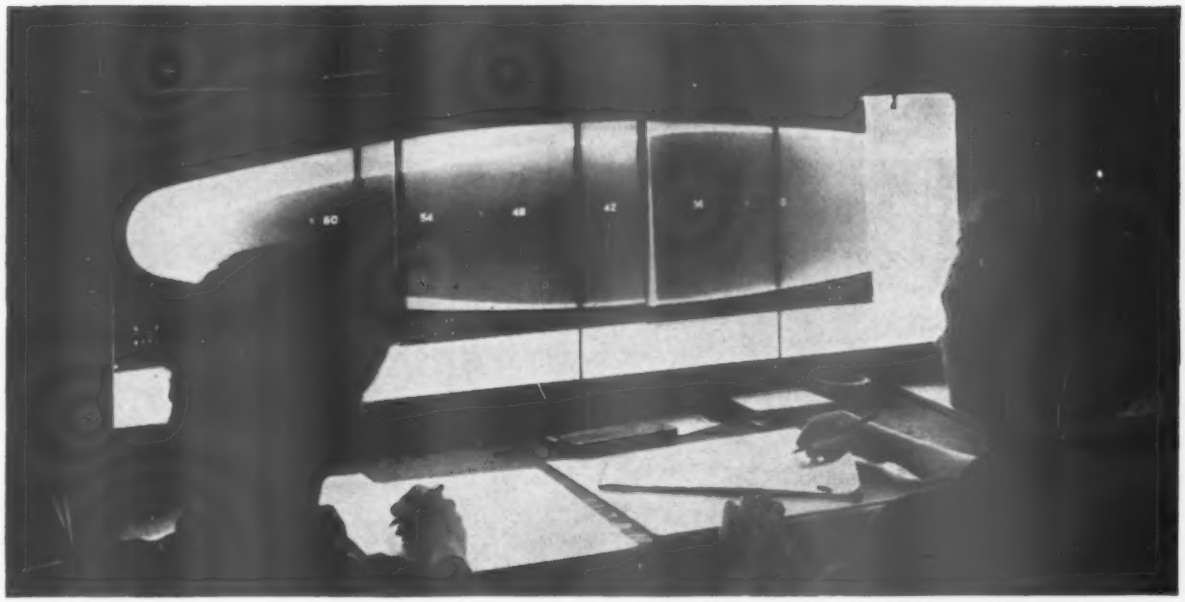
GENERAL CHEMICAL COMPANY
40 RECTOR STREET, NEW YORK 6, N. Y.

Technical Service Offices: Atlanta • Baltimore • Boston Bridgeport (Conn.) • Buffalo • Charlotte (N. C.) • Chicago Cleveland • Denver • Detroit • Houston • Kalamazoo (Mich.) Kansas City • Milwaukee • Minneapolis • New York Philadelphia • Pittsburgh • Providence (R. I.) • St. Louis Utica (N. Y.) • *Pacific Coast Technical Service Offices:* Los Angeles • San Francisco • Seattle, Wenatchee, Yakima (Wash.)

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

"PROP" CONTROL *by*





A 70-ton pull at 7-miles a minute—7-miles up! That's what propellers for today's fighting planes must withstand—that's why each "prop" blade must pass the most exhaustive tests before becoming part of a modern fighter or bomber.

Internal structural fitness is a "must" for these blades—there is no margin for error where so much depends upon unfailing performance. X-ray inspection is the logical method for determining that fitness. Production records of the American Propeller Corporation emphatically demonstrate that fact.

American Propeller produces hollow steel propellers for many types of combat aircraft. Each is x-ray inspected at three stages of the manufacturing process. Three G-E X-Ray Units are employed for this all-important function.

These G-E X-Ray installations have increased inspection capacity approximately 300%—have released essential workers for other vital jobs within the plant, by making possible nearly 50% reduction in inspection personnel. Overall plant production has been stepped-up materially—production upon which retention of our present air superiority is so greatly dependent.

G-E Industrial X-Ray Units are the choice of a majority of industries employing x-ray inspection. Designed and built to withstand the rigorous service expected of heavy industrial equipment—they are FLEXIBLE, PLUS-POWERED, 100% SAFE, and EASY TO OPERATE. Available in a full range of power up to and including 1,000,000-volts, there is a G-E X-Ray Industrial Unit to meet every requirement.

For full information about these and many other exclusive G-E X-Ray features—or the services of experienced G-E X-Ray engineers in applying x-ray to your problem—act today, write or wire Department N311.

Today's Best Buy *U. S. War Bonds*

GENERAL ELECTRIC
X-RAY CORPORATION

2012 JACKSON BLVD. CHICAGO (12), ILL., U. S. A.

60 Hydro-Blasts In The U.S., Canada and England

BEFORE HYDRO-BLAST: MANPOWER USED AND EXISTING COSTS ON DAILY BASIS

Before Hydro-Blast

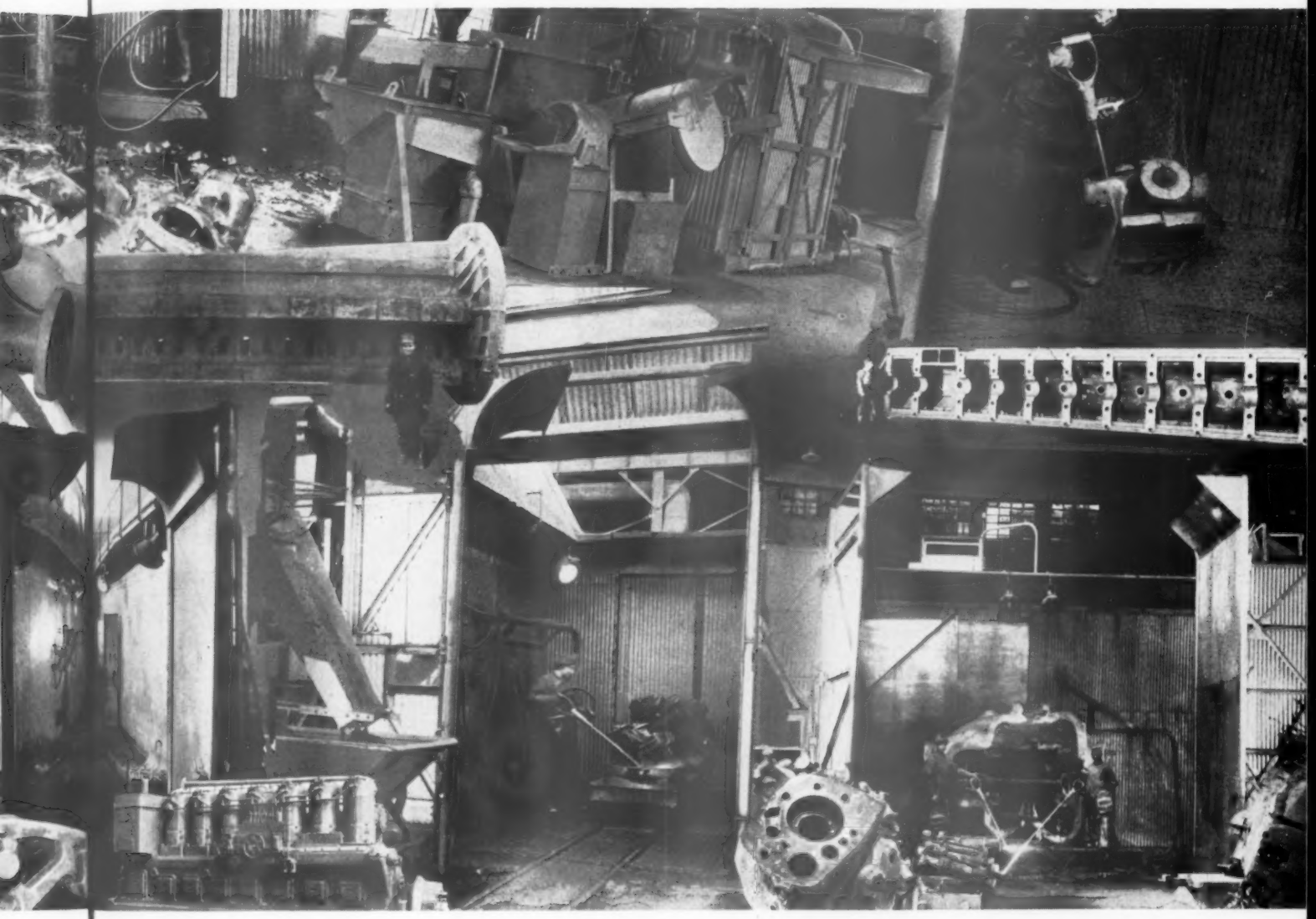
Daily Man Hours		Daily Cost
80	**LABOR**	
	Core Knockout, 8 men @ .85 —.9916 per hour, which equals	$ 79.33
	Common Labor, 3 men @ .85 —.9916 per hour, which equals. (Work six days per week, 10 hours per day, time and one-half after 40 hours.)	29.75
40	**SAND BLAST**	
	Operates 20 hours per day. Cost per hour 3.50 equals. (Four men operate, labor cost included in 3.50 operating cost.)	70.00
20	**OUTSIDE CASTING CLEANING**	
	Two tons per day @ 32.00 per ton. (Above includes metal chipping.)	64.00
6	**TRUCKING**	
	Approximately 8 miles per day, six days per week. Cost approximates: Truck 3.00 per hour—48 miles per week, 18 hours per week—three hours per day.	9.00
6	**WASTE SAND**	
	Three hours per day @ 3.00.	9.00
6	**CORE SAND**	
	Four tons per day @ 3.00	12.00
	Total Existing Costs (Daily Basis)	$273.08
158	**Total Man Hours Per Day.**	

After Hydro-Blast

Daily Man Hours		Daily Cost
1	**LABOR**	
	Core Knockout (eliminated by Hydro-Blast whose operating cost is included in these costs)	00.00
	Common Labor, 1 man @ .9916 x 10 hours	9.92

The Hydro-Blast Corporation • 2550 N

Here's What Hydro-Blast Does For One User



AFTER HYDRO-BLAST: COSTS AS AFFECTED BY A ONE-GUN HYDRO-BLAST SYSTEM

	SAND BLAST Eliminated by Hydro-Blast	00.00
	OUTSIDE CASTING CLEANING Eliminated, but metal chipping cost will remain. Conservative estimate in cost will be reduced by fifty percent, therefore	32.00
1.2	**TRUCKING** Trucking of castings eliminated	00.00
	Waste Sand trucking reduced eighty percent	1.80
1.2	**CORE SAND** Cost reduced because of recovery eighty percent	2.40
16.0	**HYDRO-BLAST OPERATING COST (Detailed below)** Two men involved	35.51
	Hydro-Blast Costs (Daily Basis).	**$81.63**
19.4	**Total man hours using Hydro-Blast instead of 158.**	

Hydro-Blast Operating Costs:

Electricity—69 HP = 510 KW @ .0125	$ 6.40
Labor—2 men @ 1.17 x 10 hours	23.40
Water—57,000 gallons @ .03	1.71
Nozzles—10 hours @ .05	.50
Maintenance—10 hours @ .35	3.50
TOTAL DAILY OPERATING COSTS	$35.51

COMPARISON

Costs before Hydro-Blast	$273.08
Same Costs with Hydro-Blast	81.63
DAILY SAVING	191.45
YEARLY SAVING	$59,732.40

The savings evaluated above are very conservatively estimated. In addition to these evaluated savings there are so many other savings that are important, though not evaluated in money. Among these are the following:

1. No waste of core rods or other metal to dump.
2. No breakage of core rods, no straightening required.
3. It is possible to use core arbors.
4. Cleanliness and occupational disease hazard are greatly improved. It is to be noted that this foundry is extraordinarily clean and "good housekeeping" is carefully observed.

The Best Known Name in Iron

Brands:

BUFFALO • DETROIT • SUSQUEHANNA

Grades:

BASIC • FOUNDRY • MALLEABLE • FERRO-SILICON • SILVERY

THE HANNA FURNACE CORPORATION

Buffalo Detroit New York Philadelphia Boston

Merchant Pig Iron Division of

NATIONAL STEEL CORPORATION

Executive Offices: Pittsburgh, Pa.

5 REASONS FOR CLEVELAND TRAMRAIL CORE-HANDLING EQUIPMENT

Above: After baking the racks are taken directly to molding floor. No time-consuming rehandling of cores.

Below: Coremakers' plates of cores are placed on racks conveniently located. When racks are loaded, they are propelled into ovens.

1 ELIMINATES REHANDLING — Delivers cores from coremaker to oven, thence to molding floor, via overhead tramrail route without rehandling.

2 CUTS COSTS — Saves time, speeds production, cuts costs. Coremakers spend more time making, less time handling cores.

3 REDUCES BREAKAGE — Easy operating carriers on smooth overhead track eliminate damaging vibrations and shocks. No chafing, cracking, or breaking of cores in transit.

4 NO REINFORCEMENT WIRES — Because of cushion-like handling with Cleveland Tramrail reinforcement wires can be eliminated for many cores. (Removing core wires sometimes costs more than cores themselves.)

5 WITHSTANDS OVEN TEMPERATURES — Cleveland Tramrail carriers are designed for usual oven temperatures up to 450 degrees F. No "sticky" wheel bearings.

Cleveland Tramrail core-handling equipment is inexpensive. It is easy to install in present plants. It is ideal for use through continuous baking ovens.

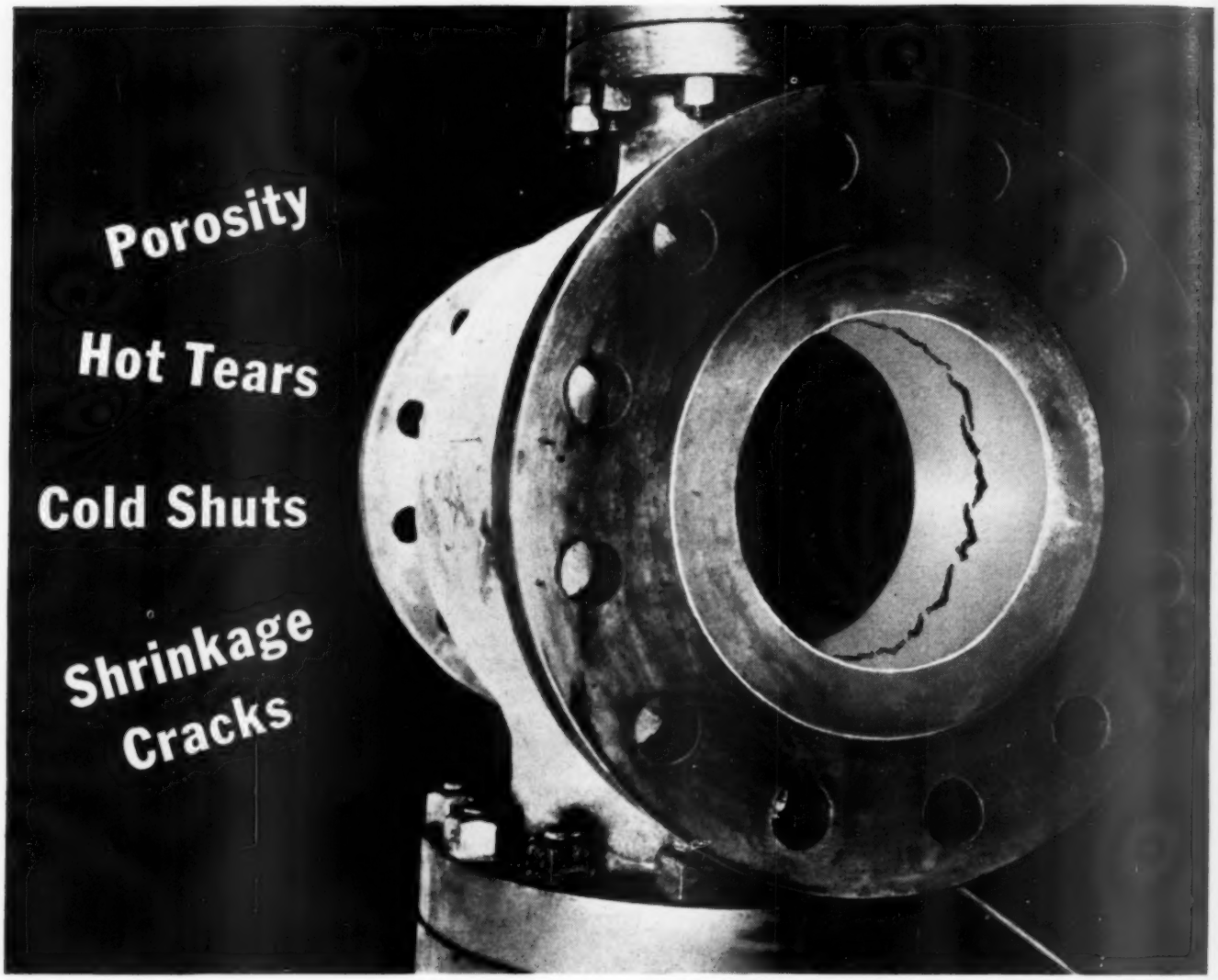
Now is the time to consider establishing real efficiency in your core department. Have an experienced Cleveland Tramrail sales engineer offer you recommendations — no obligation, of course.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1155 EAST 283RD ST. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT



Magnaflux indications of shrinkage cracks in a large cast valve body.

. . . AND YOUR REPUTATION

Every defective casting that leaves your foundry is charged against your reputation. That is why more and more foundry operators are adopting Magnaflux* inspection as a practical means of checking every casting—not a few from every lot but every piece.

The Magnaflux Method of non-destructive inspection is both fast and accurate to keep pace with modern production line operation. Iron, steel and other magnetic alloys can be visually inspected by this method. (Other Magnaflux Methods have been developed for non-magnetics).

For the more competitive business weather which lies ahead, it's a sound move, now, to investigate the possibilities of Magnaflux in your foundry. We will be glad to have one of our engineers call at your convenience.

MAGNAFLUX RESEARCH

Since the pioneering stage of the original Magnaflux Method for steel, our engineers have sought to extend the benefits of rapid non-destructive inspection techniques in every field. For the important foundry industry special portable equipment and new procedures for more sensitive results were developed.

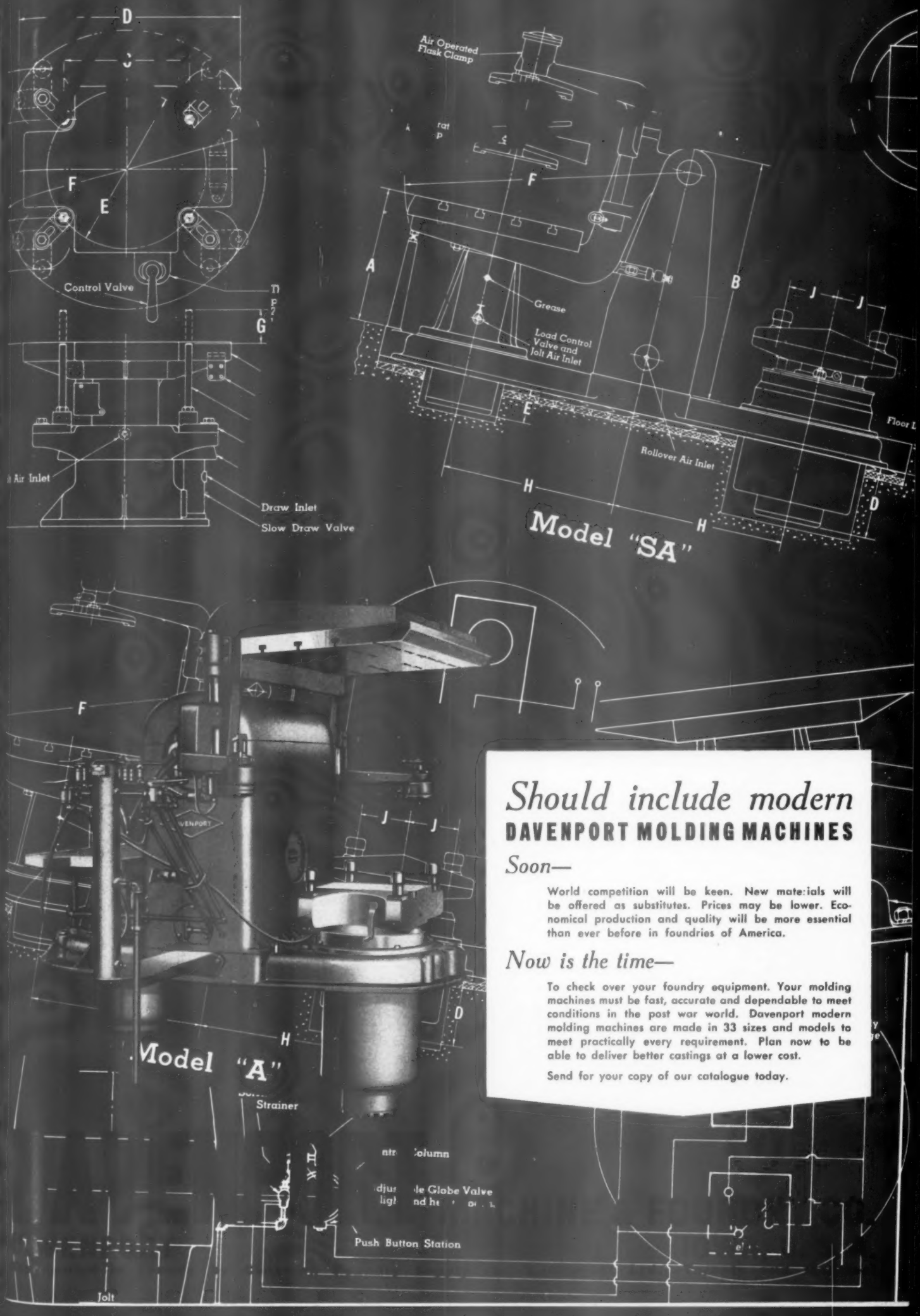
MAGNAFLUX CORPORATION

Magnaflux—the Trade Mark of the Magnaflux Corporation applied to its equipment, materials and methods for magnetic particle inspection.

MAGNAFLUX CORPORATION

5918 Northwest Highway, Chicago 31, Ill.

NEW YORK • DETROIT • DALLAS • LOS ANGELES • CLEVELAND • BIRMINGHAM



Should include modern
DAVENPORT MOLDING MACHINES

Soon—

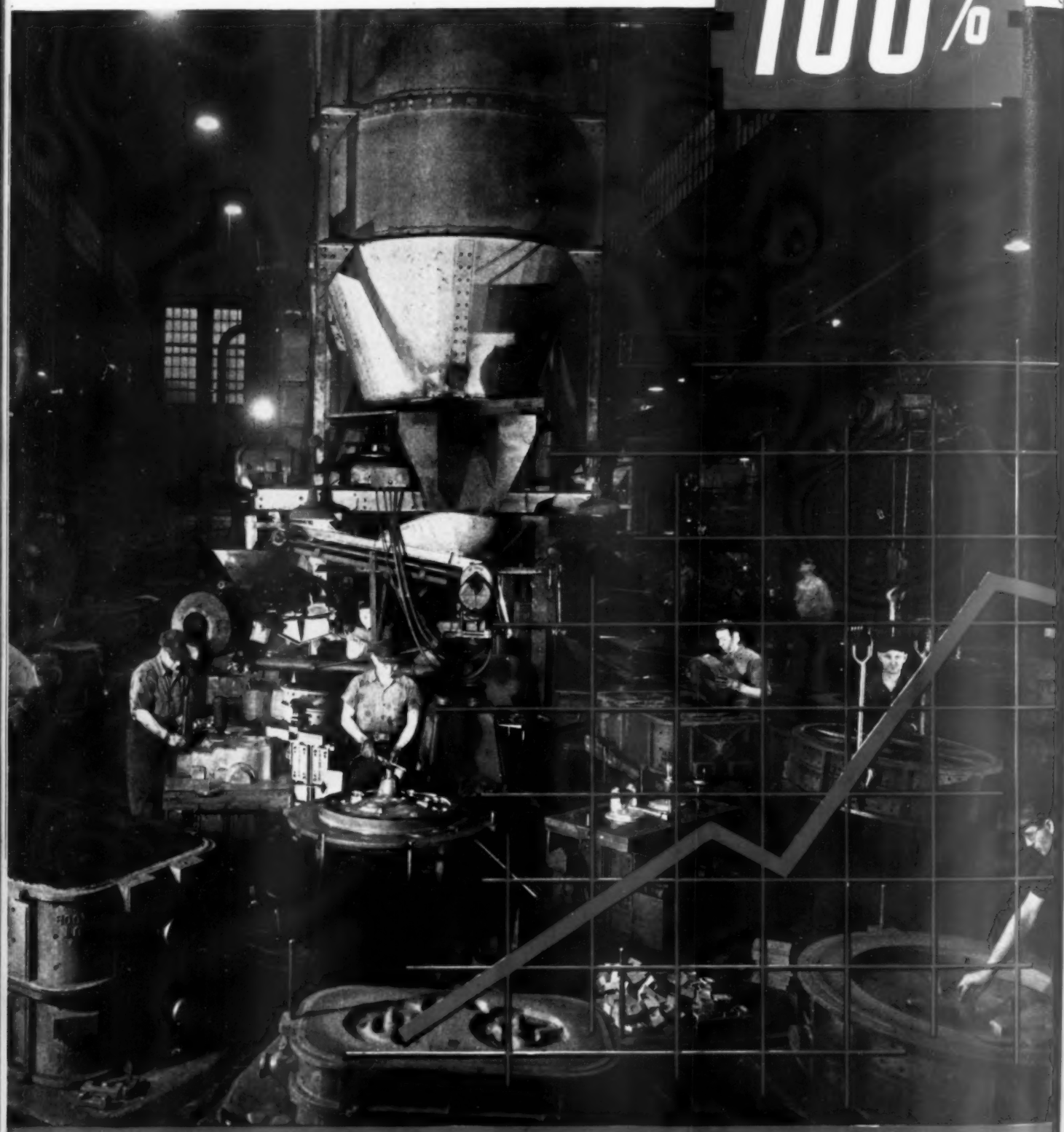
World competition will be keen. New materials will be offered as substitutes. Prices may be lower. Economical production and quality will be more essential than ever before in foundries of America.

Now is the time—

To check over your foundry equipment. Your molding machines must be fast, accurate and dependable to meet conditions in the post war world. Davenport modern molding machines are made in 33 sizes and models to meet practically every requirement. Plan now to be able to deliver better castings at a lower cost.

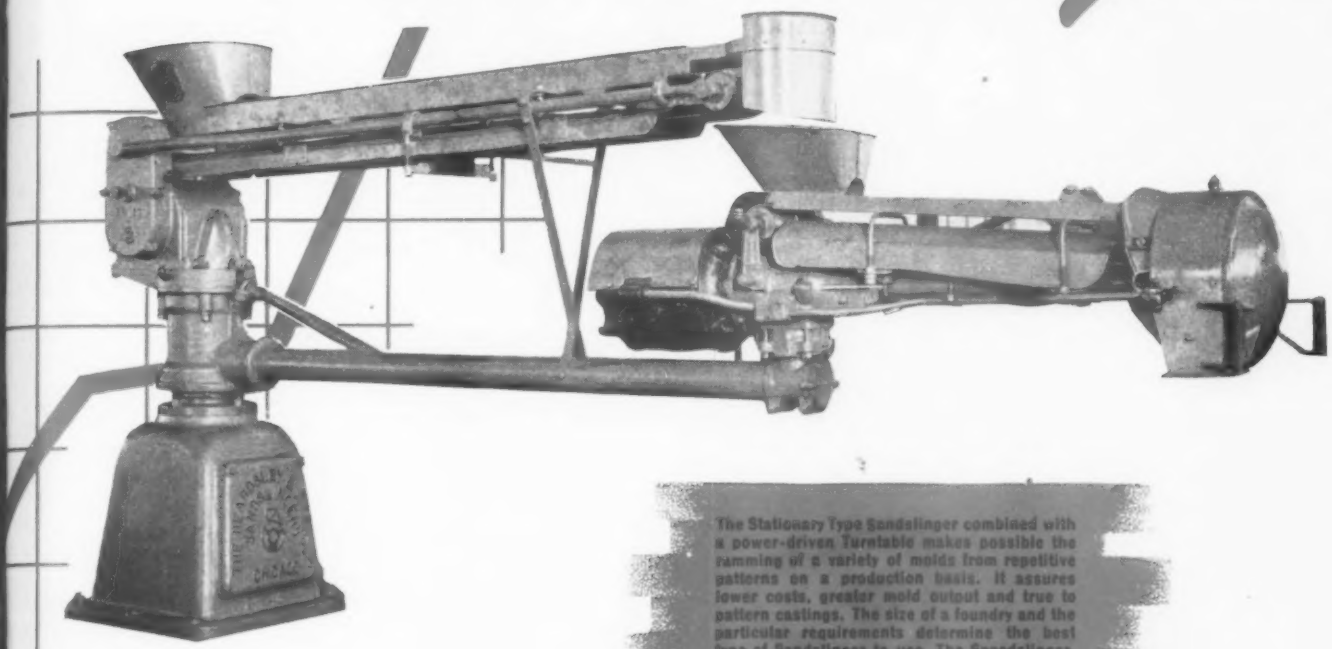
Send for your copy of our catalogue today.

PRODUCTION INCREASED 100%



HERE'S a remarkable but not unusual achievement of the Stationary Sandslinger! Three years ago the Minneapolis Foundry of the Minneapolis-Moline Power Implement Company installed this Stationary Sandslinger unit with synchronized turntable and eliptical type conveyor to ram the molds, which under the old practice required the floor area of three bays. The new Sandslinger unit occupies only one of these bays and has increased mold production 100%. Actually it produces an average of 250 molds a day on the floor space where formerly only 28 molds were made . . . and metal requirements were stepped up on this floor from 25,000 lbs. to 82,000 lbs. a day, or an increase of 230%!

WITH THE *Sandslinger*



The Stationary Type Sandslinger combined with a power-driven Turntable makes possible the ramming of a variety of molds from repetitive patterns on a production basis. It assures lower costs, greater mold output and true to pattern castings. The size of a foundry and the particular requirements determine the best type of Sandslinger to use. The Speedslinger, the Motive Junior Sandslinger, the Tractor Type, and the Swing Type all fill definite needs.

The Stationary Sandslinger, ramming with great speed and uniformity, assures amazing increases in production, savings in casting weights, lowered scrap losses, reduction in facing sand costs, and greatly increased profits.

Your men will *like* to work with the Sandslinger . . . it eliminates the hard, laborious hand ramming. Even the most inexperienced workers can learn to operate it accurately in an extremely short time.

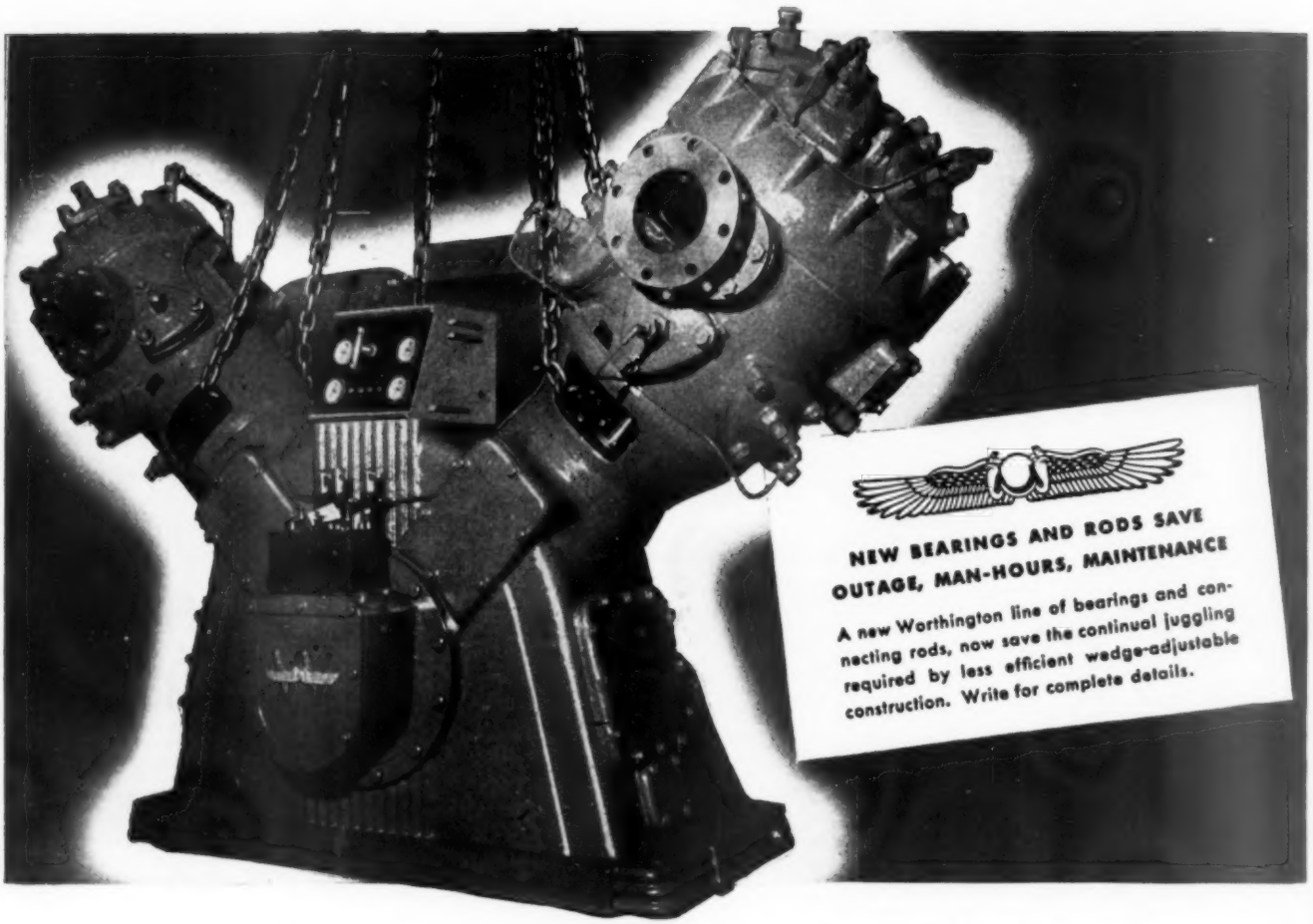
Investigate the Sandslinger now! A Beardsley & Piper Engineer will advise you the type and size best suited to your foundry conditions. Write today!

THE BEARDSLEY & PIPER COMPANY

2541 North Keeler Avenue — Chicago 39, Illinois

THE BEARDSLEY & PIPER COMPANY ARE MANUFACTURERS OF SANDSLINGERS, SPEEDSLINGERS, SPEEDMULLORS, SCREENARATORS, MULBAROS, SHAKE-OUTS, SAND CONDITIONING MACHINES, GYRATORY SCREENS

PUT IN A HUSKIE...FASTER


NEW BEARINGS AND RODS SAVE OUTAGE, MAN-HOURS, MAINTENANCE
A new Worthington line of bearings and connecting rods, now save the continual juggling required by less efficient wedge-adjustable construction. Write for complete details.

New Worthington YC "packaged" unit meets 4 requirements of modern compressor design

No erecting engineer, no special foundations are required when you install this Huskie. It comes packaged for quick installation.

Two-fisted "Y" design gives you these four big advantages:

1. ***Higher Speeds.*** Vertical Y-frame for perfect balance and higher r.p.m. Rugged construction, for continuous high speed operation.

2. ***Ease of Installation.*** 75% less foundation space than horizontals of the same capacity. Quick, safe installation — even where subsoil is poor—without special clamps or engineering service.

3. ***Accessibility of parts.*** Quicker, easier periodic inspections. Large handy openings. Valves outside, for accessibility. Full-floating metallic packing easily reached.

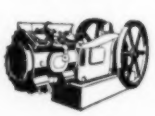
4. ***Adaptability to many drives.*** Flanged type, synchronous or induction motors, directly mounted on compressor shaft. Easily arranged for Multi-V-Drive or for coupled drive from explosion-proof motor or practically any type of rotative power.

Write for free Bulletin L-667-B1. *Worthington Pump and Machinery Corporation, Harrison, New Jersey.*

WORTHINGTON *BEHIND THE NAME*

NO OTHER COMPRESSOR WILL OUTPERFORM A WORTHINGTON

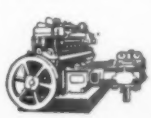
Y-types

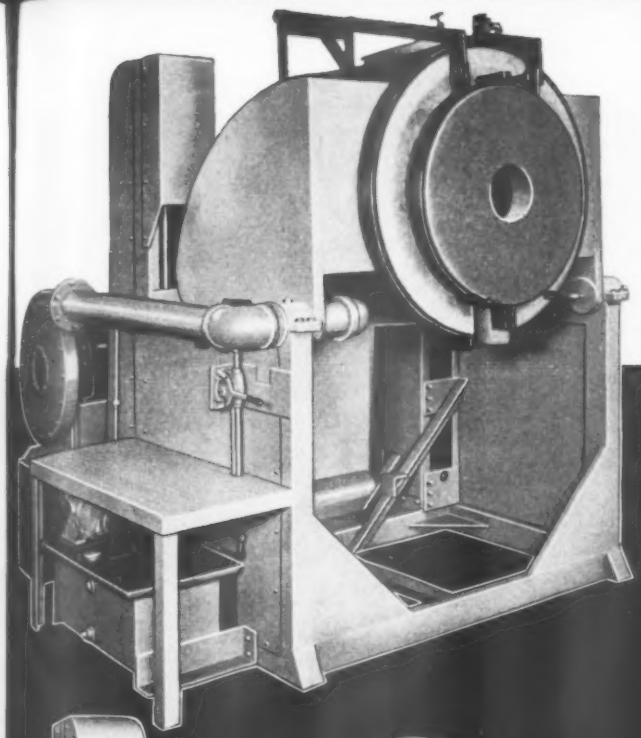

Horizontal

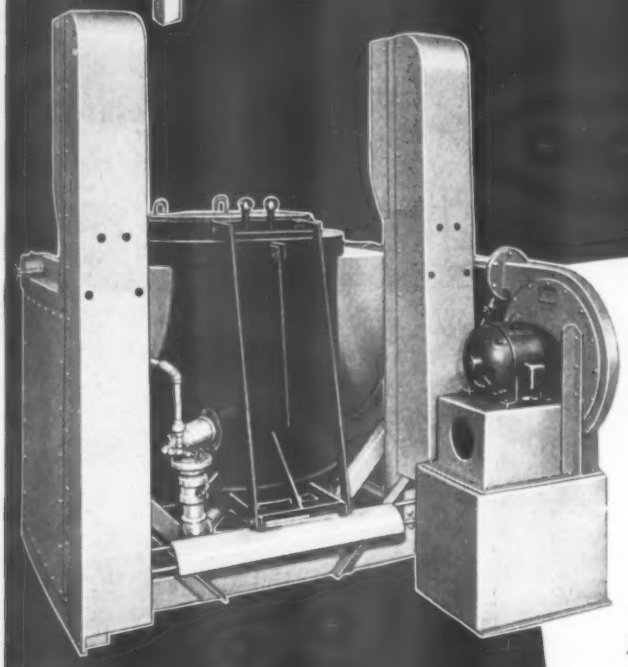
Vertical

Radial

Portable


Gas Engine Compressors





NEW!

STROMAN

HYDRAULIC TILT CRUCIBLE MELTING FURNACE

for BRASS and ALUMINUM

New, improved and now automatically tilted by hydraulic power, these Stroman Crucible Melting Furnaces are designed to fit into your foundry and melt Brass or Aluminum faster, better, safer and decidedly more economical. Sturdy hydraulic rams lift the furnace for pouring easily and gently, at the exact speed desired by the operator . . . eliminating sudden starts and hard stops. STATIONARY LIP POUR is another outstanding feature of these superb furnaces . . . for it creates a Constant Pouring Arc which removes the necessity of moving the ladle at any time during the pour.

These New Stroman Hydraulic Tilt Crucible Melting Furnaces are made to handle from No. 60 to No. 400 Crucible. It may be fired by either gas or oil, each type being equally efficient, with special Stroman Burners assuring minimum fuel costs. Their simple design makes them most efficient in operation . . . and their heavy-duty construction gives assurance of lengthy, trouble-free service. STROMAN ENGINEERS, who are qualified experts in foundry layout and all non-ferrous metal melting, will be only too glad to consult with you on any problems that may be proving to be bothersome. We are sure that they can be of assistance, so why not write today and unburden your troubles to them.

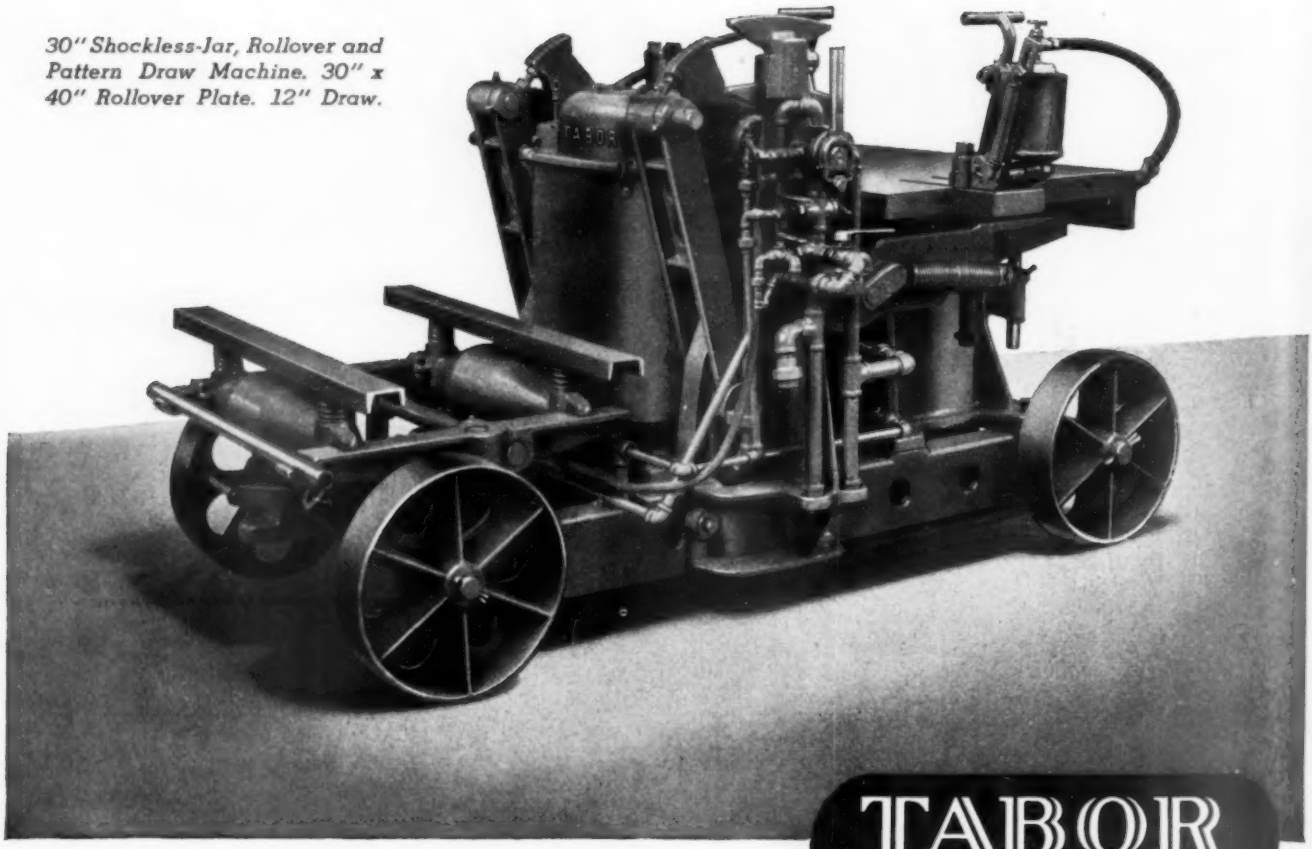
and Remember..

Stroman makes Hydraulic Tilt, Mechanical Tilt, Hand Tilt and Stationary Furnaces in all sizes for the melting of Brass, Bronze, Aluminum, Magnesium and all other types of non-ferrous metals . . . also Centrifugal Blowers that get the correct amount of air where you want it and when you want it.

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

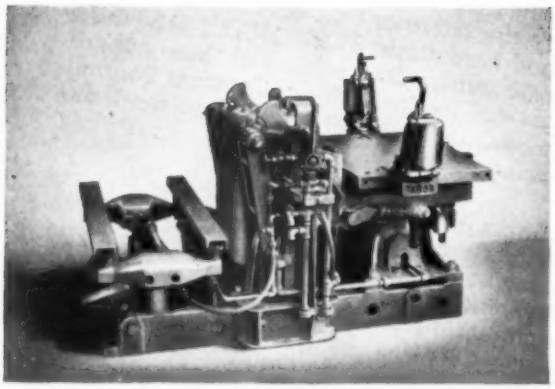
THE PETERSEN OVEN CO. 300 W. ADAMS ST. CHICAGO 6



30" Shockless-Jar, Rollover and Pattern Draw Machine. 30" x 40" Rollover Plate. 12" Draw.

TABOR
TRADE 1884 MARK

TABOR JAR, POWER ROLLOVER POWER PATTERN DRAW MACHINES



22" Plain-Jar, Rollover and Pattern Draw Machine. 22"x42" Rollover Plate. 10" Draw. Equipped with air-operated Flask Clamps.

Tabor machines handle jobs up to their full rated capacity in a matter of seconds for a complete operating cycle. Ramming time is reduced to a minimum by the efficient Tabor jarring member . . . Rollover is oil controlled for maximum speed with absolute safety . . . Automatic leveling device eliminates possibility of shift . . . Draw is smooth at any desired speed by air-on-oil, and is accurate throughout the life of the machine.

Tabor Jar, Rollover Pattern Draw Machines are furnished in all practical sizes; plain-jar or shockless-jar; with or without air-operated flask clamps. Bulletin 424 illustrates and describes the complete line.

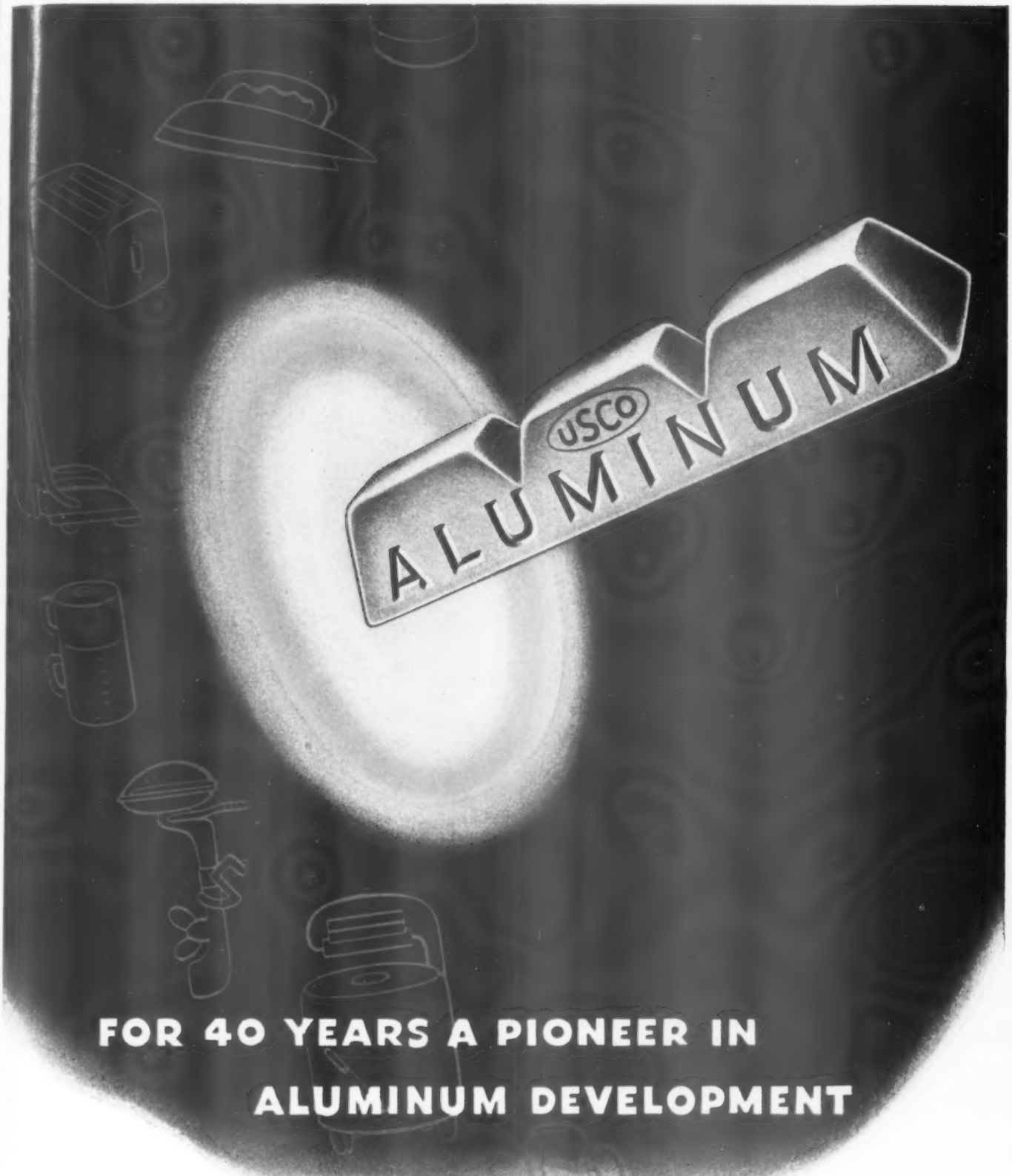
FLASK LIFT MACHINES • SQUEEZERS AND JAR SQUEEZERS • JARRING MACHINES • TABOR-BRASIVE CUT-OFF MACHINES • ROLLOVER MACHINES

Since 1884 . . . MANUFACTURERS OF FOUNDRY MOLDING MACHINES

THE TABOR MANUFACTURING CO.

6225 TACONY STREET **PHILADELPHIA 35, PENNSYLVANIA**

Representatives: Snyder Foundry Supply Co., Los Angeles, Calif.; Pacific Graphite Works, Oakland, Calif.; Carl F. Miller & Co., Seattle, Wash.



FOR 40 YEARS A PIONEER IN ALUMINUM DEVELOPMENT

USCO . . . your assurance of quality aluminum alloy ingot and deoxidizing shapes produced to exact specifications and backed by over 40 years of experience.

USCO

U.S. REDUCTION CO.

EAST CHICAGO, INDIANA

. . . and Put More Man-Hours to Work

You're giving your ladlemen *protected vision* when you give them these N.F.A. and N.A.S.O. goggles . . . *Protection* that keeps them and their eyes on the job . . . adds extra minutes to precious man-hours.

Protected by these goggles, a ladleman doesn't have to take his eyes off the work. The impact-resistant quality of Super Armorplate lenses lets him work without fear. Snug-fitting, pliable leather masks give him comfort while wire-screen ventilating around the eyecups keep lenses clear, eyes cool. And AO's one-piece headband won't slip or catch his hair.

When you order these goggles, specify either clear lenses or lenses made of glare-absorbing Calobar. Your nearest AO Branch Office can supply you *now*.

Get more man-minutes
out of every man-hour
GET AO GOGGLES

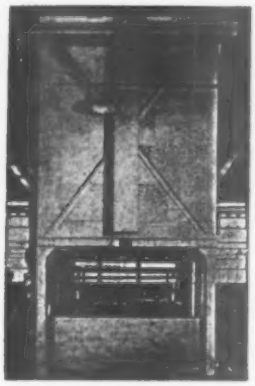
American Optical
COMPANY
SOUTHBRIDGE, MASSACHUSETTS

Carl-Mayer CORE AND MOLD OVENS

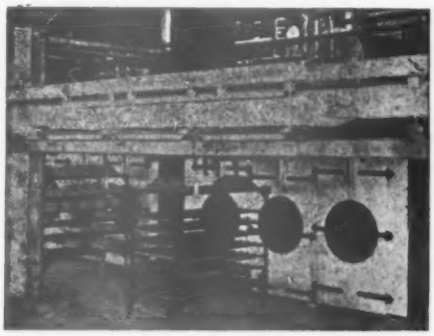
ALL TYPES . . . ALL SIZES

SERVING INDUSTRY OVER A QUARTER CENTURY

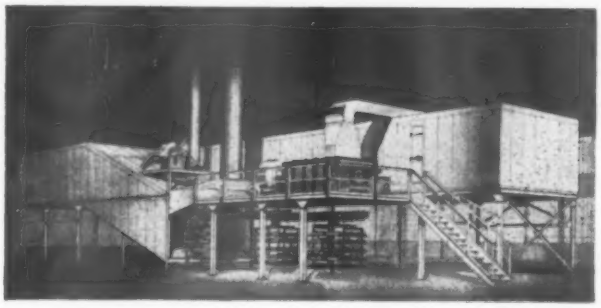
3 Outstanding Carl Mayer Vertical Ovens at General Steel Castings Corp. Each oven 67' high, 80 tons per bake, per oven.



Typical Carl Mayer Vertical Core Ovens as installed at outstanding foundries.



Part of large Carl Mayer Recirculating Gas Fired Rack Type Oven installation at The General Electric Co.

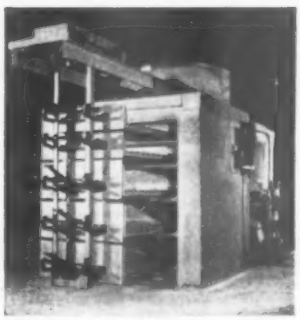


3rd Continuous Monorail Core Oven for Eclipse Aviation, Bendix Aviation Corp. 27' wide, 78' long, load capacity of 10½ tons per bake. Larger installations for Ford Motor Co., Studebaker Corp. & Packard Motor Car Co.

CARL MAYER ENGINEERS WILL DESIGN THE OVEN FOR YOU

Creative engineering and "know how" does pay. Some of our recent installations are spectacular and indicate the confidence placed in our engineering service.

Whatever your core-baking problem is, you can depend on us for the most productive and economical solution.



A new improved, convection Rolling Drawer Oven, recently installed for Aluminum Co. of America and for one of the foremost Foundry Research Institutions in the country.

Car Type Core Oven, recirculating air heater, gas fired; installations at Ford Motor Company, General Steel Castings Corp. and United States Steel Corp.

THE CARL MAYER CORPORATION • **3030 Euclid Ave., Cleveland, Ohio**

SERVING CONCERNS LIKE *these:*

Aluminum Co. of America
American Magnesium Corp.
American Radiator & Standard Sanitary Corp.
Babcock & Wilcox Co.
Bridgeport Brass Co.
Bucyrus-Erie Co.
Brown Industries Inc.
Dunkirk Radiator Co.
Eclipse Aviation Division of Bendix Aviation Corp.
Electric Autolite Co.
Ford Motor Co.
Fort Pitt Steel Casting Co.
Frank Foundries Corp.
Fremont Foundry Co.
G & C Foundry Co.
General Motors Corp.
General Electric Co.
Gilbert & Barker Mfg. Co.
Henry J. Kaiser, Inc.
Packard Motor Co.
Shenango Penn Mold Co.
Studebaker Corp.
United States Steel Corp.
Whiten Machine Works
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A *Real* INVESTMENT FOR MORE PRODUCTION!

DIAMOND FLASKS

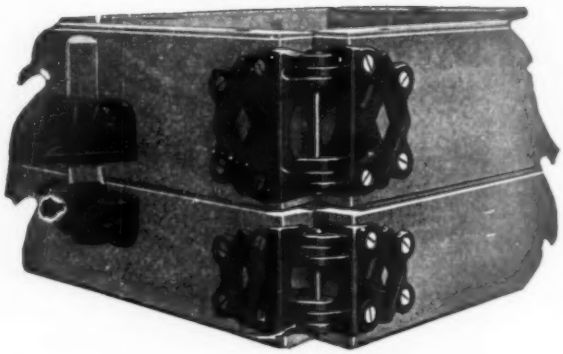
No matter what happens—you'll never be wrong if you equip for production with *good* flasks. Because we can give you many exclusive features in a flask developed over a period of 50 years, it can also be said that, "You can't go wrong on a Diamond," either. Note these important features:

- **A SUPERIOR LATCH (exclusive)**

  It's self-compensating for wear. The tighter you draw it, the firmer the grip. Has special cam which is easily adjustable as extreme wear on parts develops. Only *Diamond* has this patented feature.

- **PRECISION-MADE**

  Made from the finest grade of well-seasoned cherry stock, all flasks are made to precise measurements according to your specifications.



- **A PATENTED HINGE (exclusive)**

  Note the construction of Diamond hinges. The lugs are carefully milled and are interlocking which eliminates "play" no matter how long or how hard the flask is used.

- **SPECIAL SHAPES**

  We regularly supply customers with special shape flasks, including round flasks, and special cut partings.

STEEL JACKETS

Made from Nos. 7 to 10 gauge steel, true to size and taper. Are practically indestructible, and retain their shape under severest conditions. Thousands of these jackets in use.

DIAMOND

CLAMP AND FLASK COMPANY

Telephone 2553 **Richmond, Indiana**

Designers of CORE PLATES, JACKETS, BANDS, FLASKS *since 1889*

A NEW *Application for* Wilson RECTANGULAR BELL TYPE FURNACES! *for* MALLEABLEIZING IRON CASTINGS

WILSON

Gas Fired
Low Cost Heating
Uses ANY type of
Industrial Gas

HERE is the first picture of an installation of 19 Wilson Rectangular Bell Type Furnaces and 25 Bases for malleableizing heavy section iron castings. This same type of furnace is also in use for the same process in medium and light weight sections, with the pieces contained in alloy baskets.

25 Furnaces now in operation — full information available on request.

This furnace is gas tight and is heated with Wilson vertical radiant tubes. A protective atmosphere is generated from the carbon in the metal without additional equipment.

The Wilson Annealing Unit is covered by Patents Nos. 1,952,402, 2,068,477, 2,078,356, 2,081,612, 2,089,843, and other patents pending.

ENGINEERED AND CONSTRUCTED BY THE

Lee Wilson ENGINEERING Co., Inc.

20005 West Lake Road CLEVELAND, OHIO

Telephone ACademy 4670

INDUSTRIAL FURNACES ★ RADIANT TUBE HEATING ★ HEAT TREATING PROCESSES

DALLETT PNEUMATIC
Since 1883
AND HAND CHISELS

SINCE 1883 The Dallett Company has been making quality tools. A reputation that is consistently emphasized in every Dallett product . . . In the Dallett line of chisels go only the finest of steel and the most exacting workmanship. Every chisel is scientifically heat-treated and carefully tested before it is permitted to bear the Dallett mark.

Dallett Pneumatic Chisel Blanks and Chisels are manufactured in most trade standard shanks . . . Chisels for Chipping Hammers, Scaling Tools and other uses are available in a wide variety of styles and sizes of cutting edges.

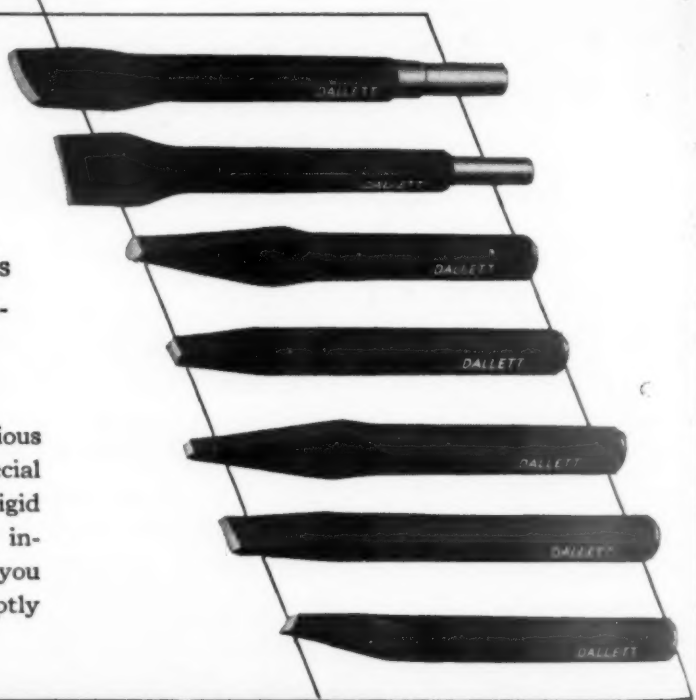
Safety Retainer Shank Chisels are carried in stock for most makes of small Pneumatic Tools with Retainer type bushings.

Write for Bulletin No. 200.

DALLETT FORGED TOOLS

A wide variety of Hand Chisels and Tools are generally in stock for immediate delivery. Write for Bulletin No. 210.

We have facilities and equipment to forge various special types of Pneumatic and Hand Tools. Special tools to meet any particular needs are made to rigid specifications. Our Engineering Department invites consultation on any special problems you might have. Estimates will be furnished promptly on any special hand-forged tools.

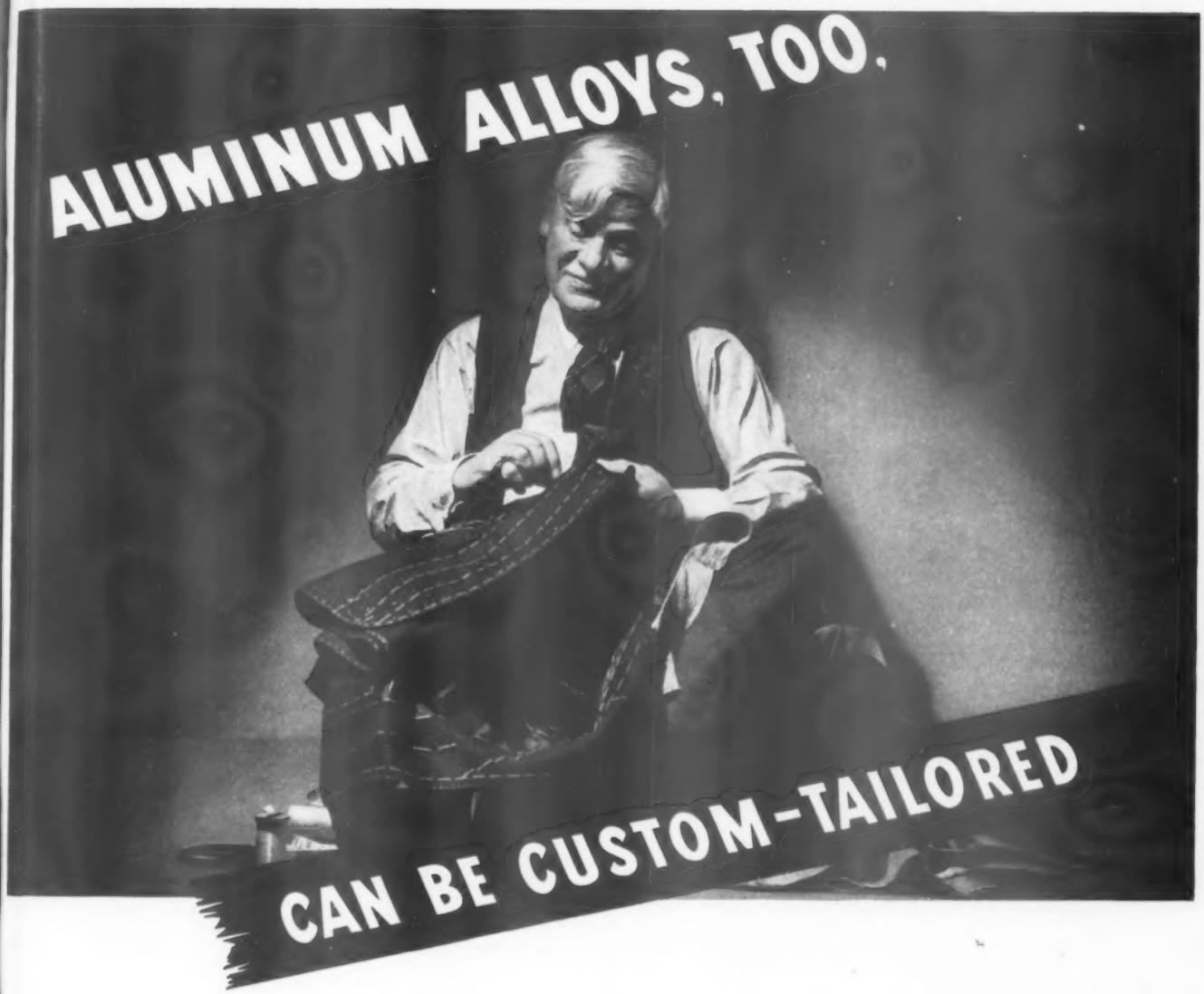


PNEUMATIC DALLETT EQUIPMENT ACCESSORIES

THE DALLETT COMPANY

MASCHER AT LIPPINCOTT STREET, PHILADELPHIA 33, PA.

Manufacturers of Pneumatic Tools and Accessories



Simple or complex, whatever the casting requirement . . . an aluminum alloy can be tailored to fit in most cases!

Popular and long-established applications, together with constant laboratory research and new processes born of war, now make Aluminum the all-purpose metal.

Scores of tough "assignments" have been met by our aluminum alloys . . . their amazing versatility . . . their reliability . . . their performance records all have been well tested and approved.

For the swift-paced, highly competitive post-war market, alert manufacturers are devising new methods . . . new means of meeting the inevitable challenge. Many of them are already making plans to use this unique metal . . . Aluminum . . . the metal that has done so much . . . that promises even more!

Name the casting requirement . . . whatever it may be . . . in practically every case, we can produce an aluminum alloy that meets all requirements satisfactorily and economically.

R. Lavin & Sons, Inc.
Chicago 23, Illinois

The National Smelting Company
Cleveland 5, Ohio

Niagara Falls Smelting & Refining Corp.
Buffalo 17, New York

Sonken-Galamba Corporation
Kansas City 18, Kansas

U. S. Reduction Co.
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Aluminum and Magnesium, Inc.
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The American Metal Company, Limited
New York City 6

Apex Smelting Co.
Chicago 12, Illinois

Berg Metals Corporation
Los Angeles 11, California

The Cleveland Electro Metals Co.
Cleveland 13, Ohio

Federated Metals Division American Smelting and Refining Company
New York City 5 and Branches

General Smelting Company
Philadelphia 34, Pennsylvania

Samuel Greenfield Co., Inc.
Buffalo 12, New York

William F. Jobbins, Inc.
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111 West Washington Street, Chicago 2, Illinois

BUY BONDS

Pioneer in

GRINDING WHEEL PROGRESS

for an entire industry

WITHIN the past five years, Peninsular has pioneered advancements in snagging and stainless steel grinding which actually have cut grinding costs in half.

Such forward steps in the design and use of abrasive wheels are the natural result of a policy adopted 55 years ago, when the founders of Peninsular resolved to build only the *very finest* grinding wheels.

Even under the mad pace of war production, when all industry has moved ahead faster and farther than ever before, Peninsular has remained in the forefront of that progress.

When industry turns again to peacetime production, look to Peninsular for new and even more revolutionary advancements in the field of grinding wheel engineering and application.

A STANDING INVITATION

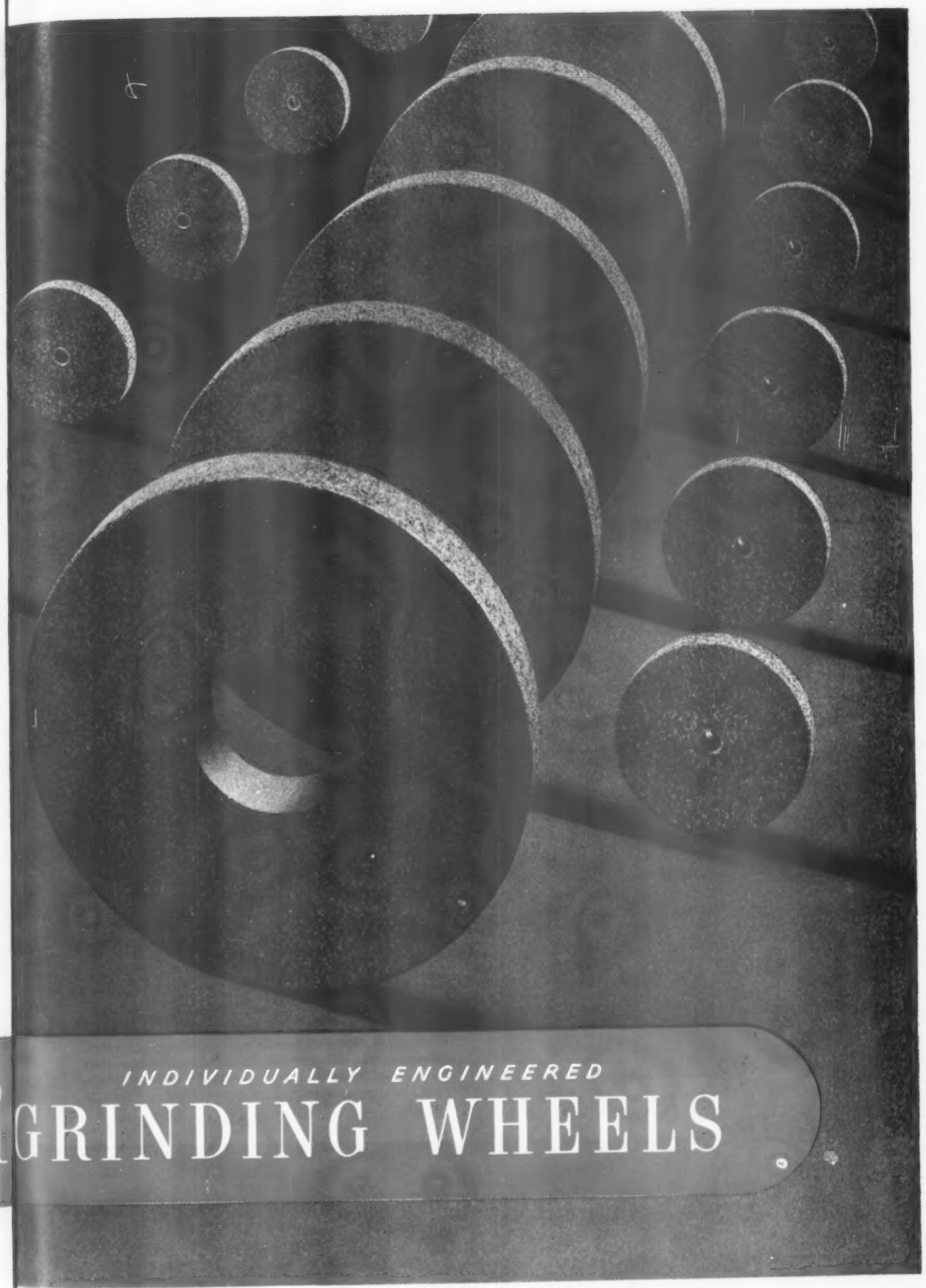
Our expert staff of factory and field engineers are ready today to help in your postwar preparation—with a production, engineering and cost analysis service beyond any offered up to now in the industry.

The Peninsular Grinding Wheel Company, 729 Meldrum Ave., Detroit 7, Michigan. *Branch Offices:* Chicago, Cleveland, Newark, Pittsburgh.

SPECIALISTS IN RESINOID BONDED WHEELS

PENINSULAR G

SINCE 1889

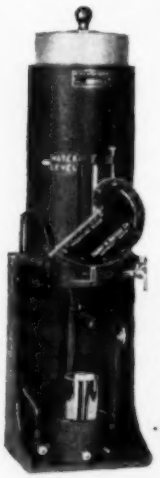

INDIVIDUALLY ENGINEERED
GRINDING WHEELS

Do you want to save Time ..... and Money?

FOUNDRY SAND CONTROL EQUIPMENT PAYS

MOISTURE TELLER

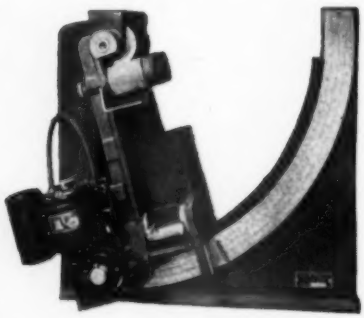
Will dry a fifty gram sample of high permeability molding sand in one minute by forcing electrically heated air through the test sample. Test is in exact moisture percentage by gravimetric method. No corrections or calibrations are required. Operating cost is very low.



PERMEABILITY METER

You can make an accurate permeability reading within 15 seconds with the Permeability Meter. Used for measuring green, dry and baked A.F.A. Permeability of molding sands, core sands, cores and molds. Use permeability meter for both daily control and for research tests to improve sand conditions in the foundry.

UNIVERSAL SAND STRENGTH MACHINE WITH MOTOR DRIVE



The universal sand strength machine with motor drive provides a strength testing machine for the laboratory that will perform a large variety of strength tests on molding sand, clays, cores and core paste. A sturdy and reliable unit from which accurate results may be obtained with the least amount of attention.

★

3 MINUTE SULFUR DETERMINATOR

Provides rapid and accurate sulfur determination of coal, coke, irons, alloy steels and other ferrous or non-ferrous materials. Time required for a complete analysis, exclusive of weighing samples, is 3 minutes. A substantial unit suitable for both preliminary and final sulfur determinations.

★

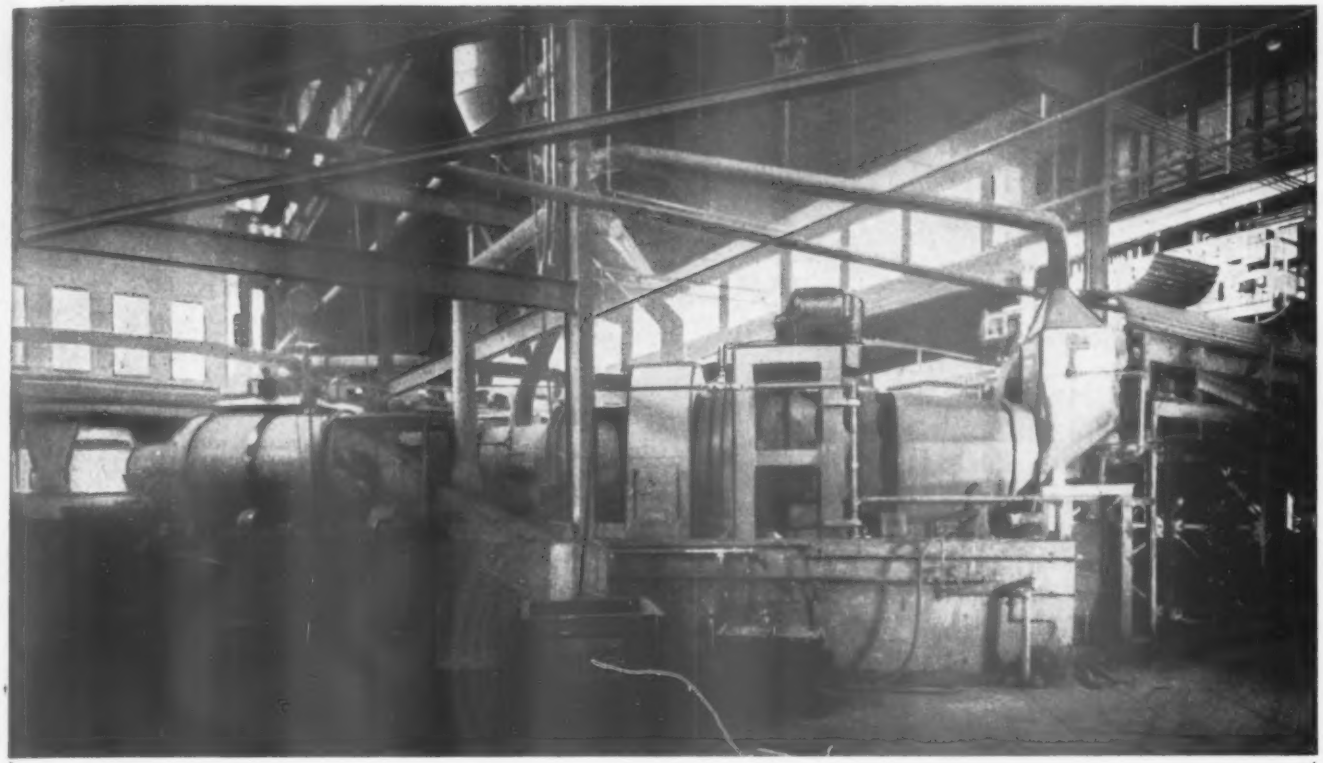
2 MINUTE CARBON DETERMINATOR

The improved 2 minute carbon determinator enables operator to determine either preliminary or final carbon content of all metals with speed and accuracy. New features eliminate much of the human equation and simplify procedures. Complete determination can be made within 2 minutes after sample is weighed.

CONTROL EQUIPMENT SAVES TIME

Harry W. Dietert Co.

9330 ROSELAWN • • • DETROIT 4, MICH.



Ransohoff

AUTOMATIC STAR-RETURN WET CLEANING MILLS

From shake-out to sorting conveyor this is an AUTOMATIC operation . . . no manual handling . . . with the staggering quantity cleaned of

70 TONS IN 8 HOURS

An actual case history of one of the most successful, and by no means uncommon, installations of RANSOHOFF EQUIPMENT designed and built after a study of this company's problems. Ransohoff Engineers are in the field constantly showing you how to streamline production and economize through modernization. For now and post-war, automatic cleaning mills will increase production and cut costs.

SAVE 30% to 70% ON YOUR CLEANING COSTS

The machine illustrated is a 60"x84" END-LOADING, END-UNLOADING WET CLEANING MILL with cooling conveyor from shake-out. Conveyor collects a complete batch of work which is fed into the cleaning mill. After cleaning, work is discharged into the holding and feeding drum which feeds it at a uniform rate onto a sorting conveyor. Cooling conveyor and mill are equipped with time switches so that entire equipment functions automatically without manual labor.

The installation is handling malleable pipe fittings before annealing.

THE RANSOHOFF WET METHOD is most efficient and economical because castings cascade in a mass in which stars fill all voids completely. Cleaning is rapid. No nicking, breaking or mill wear. Wet method eliminates need for dust collecting systems and reduces health hazards.

SEND US A SAMPLE BATCH . . . *Ransohoff Engineers will be glad to make recommendations.*

N. RANSOHOFF, Inc.

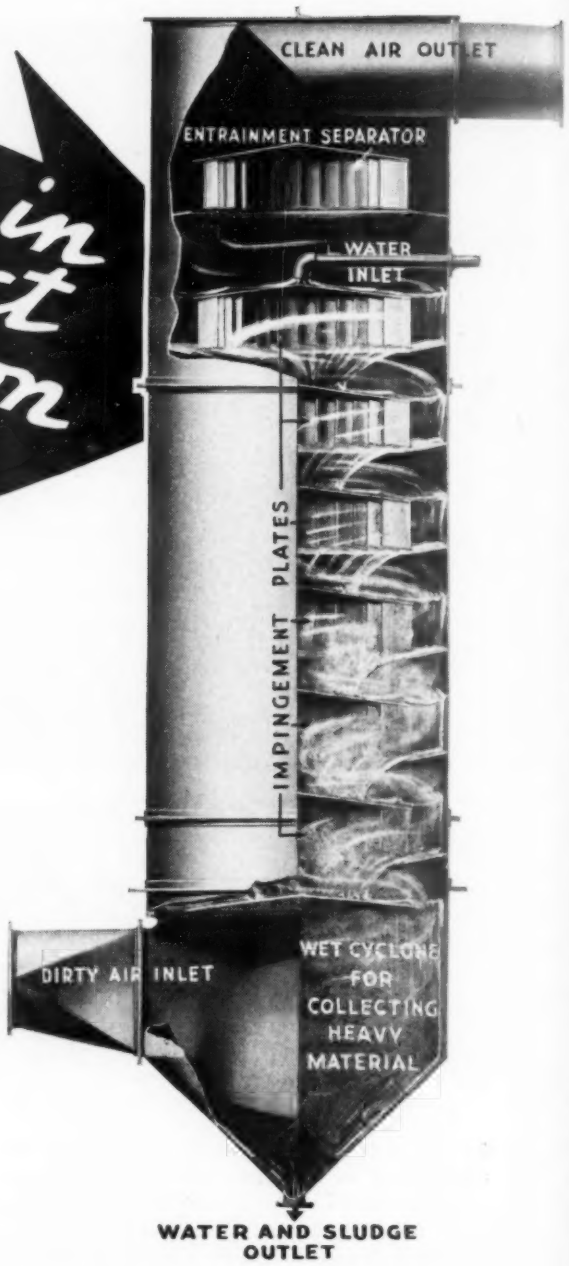
CINCINNATI, OHIO
Township Ave. and Big 4 R. R.

What goes on in here can effect your production

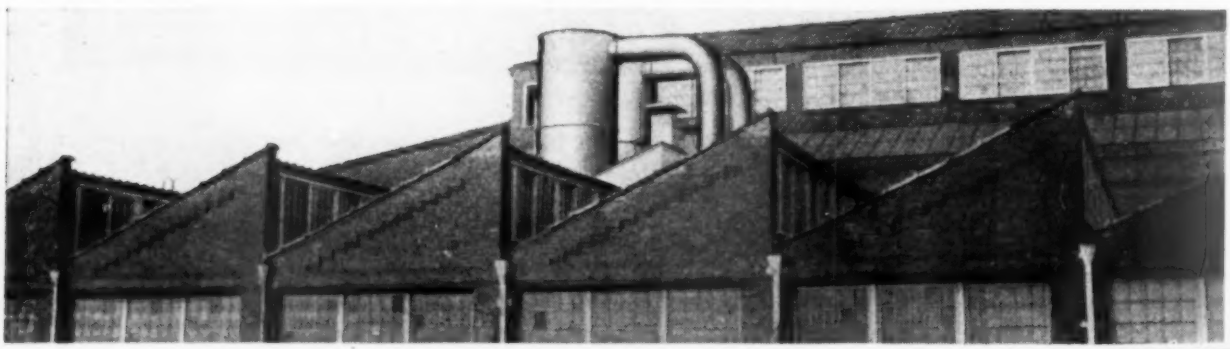
The Schneible Multi-Wash System provides the most thorough, laborless and permanent dust and fume control. With clean air in the working area at all times and float dust reduced to a minimum, human efficiency is higher and labor turnover less. In foundries with outstanding war production records, you will find Schneible Multi-Wash Dust Control Systems.

Only water is used as the cleaning medium in the Schneible Collector, which has no moving parts in the tower and does not depend on the human element for operating efficiency. There is nothing in Schneible Collectors to clog, break, burn or rapidly wear. There is no bothersome accumulation of dust to require disposal. Schneible Collectors function indefinitely with a minimum of attention.

These are some of the reasons why foundries which are installing dust collecting systems for tomorrow, as well as today, are putting in the Schneible Multi-Wash — *the original wet method dust and fume collection system.*



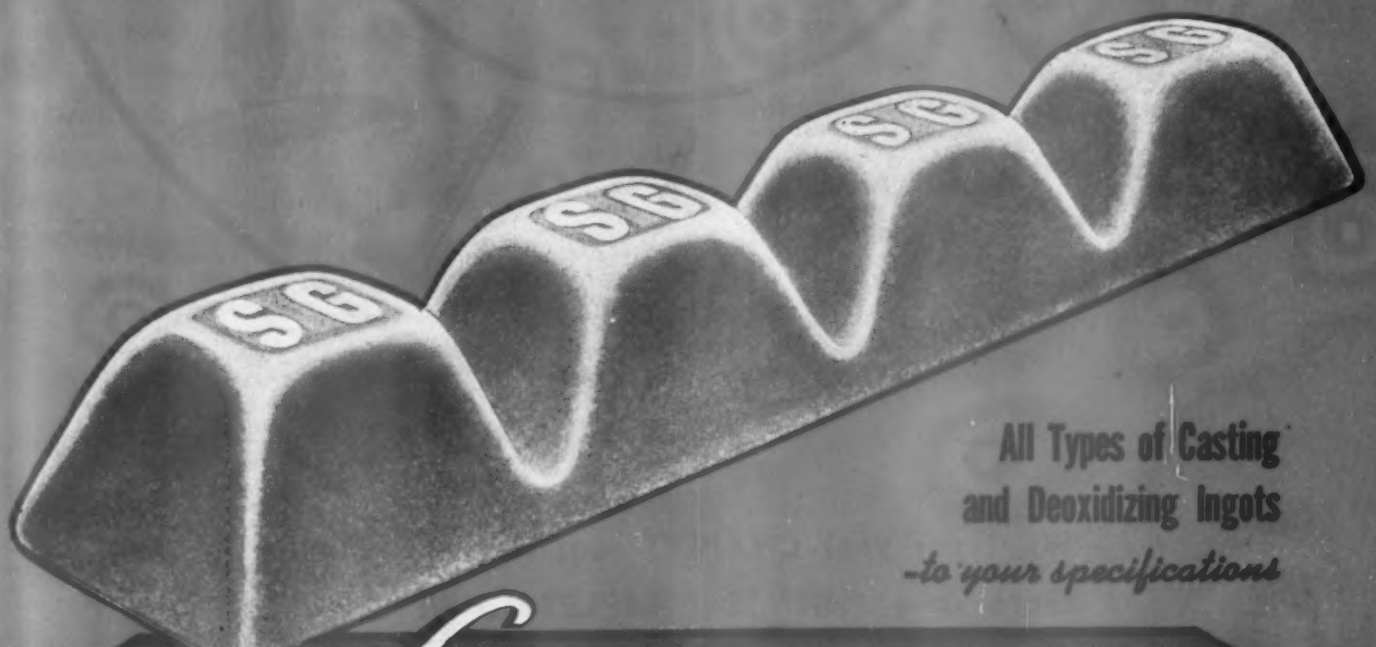
CLAUDE B. SCHNEIBLE CO.
2827 Twenty-Fifth St., Detroit 16, Mich.
Engineering Representatives in Principal Cities



SCHNEIBLE

LIQUID-VAPOR INTIMATE CONTACT EQUIPMENT for DUST COLLECTION ABSORPTION CONDENSATION AND TEMPERATURE REDUCTION

Specify S-G Aluminum ALLOY INGOT



All Types of Casting and Deoxidizing Ingots
-to your specifications

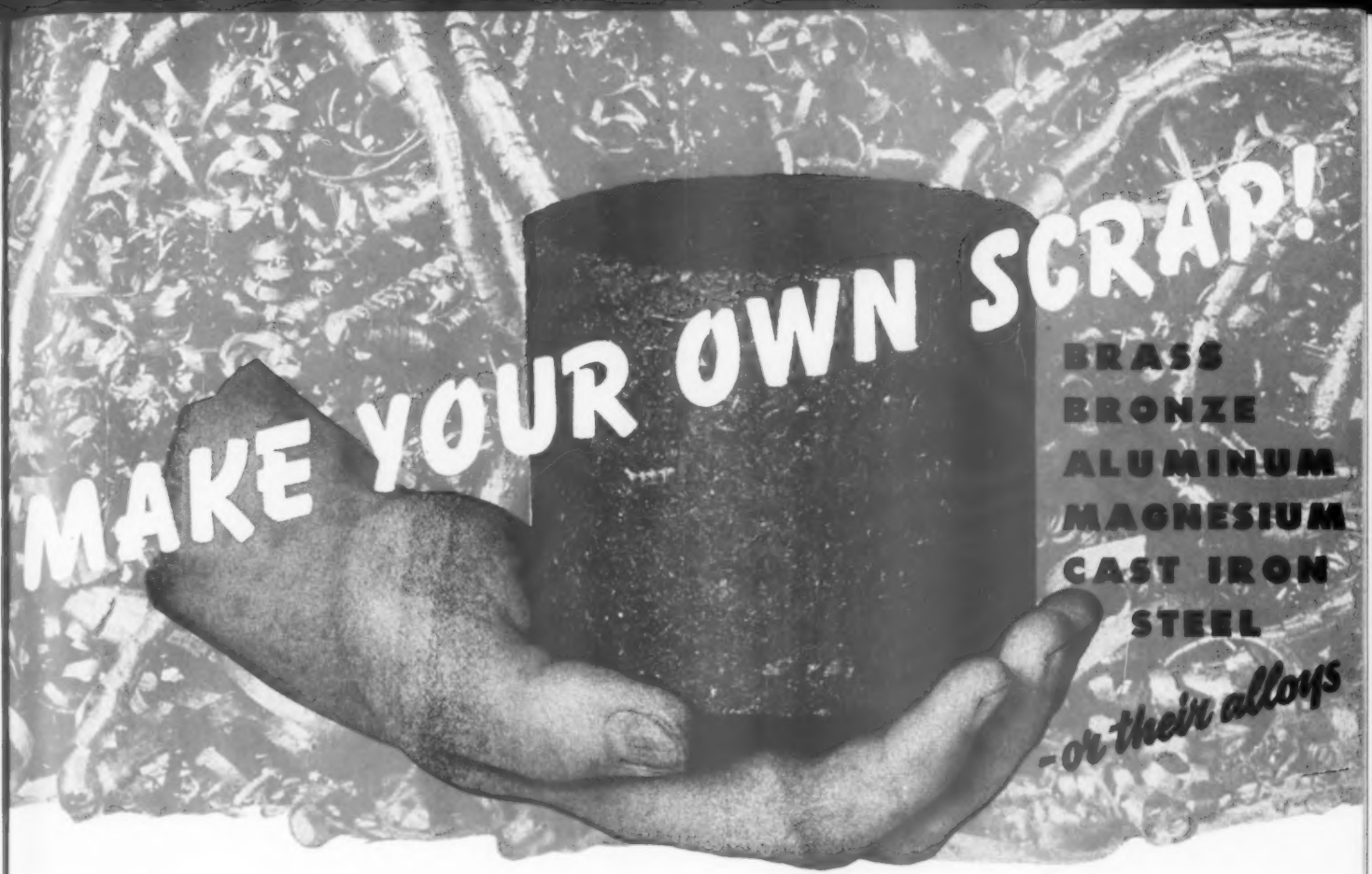
SONKEN-GALAMBA
Corporation
(MEMBER ALUMINUM RESEARCH INSTITUTE)
Riverview at 2nd Street · Kansas City, 18, Kansas

FANNER CHAPLETS

Whatever your CHAPLET requirements may be, there is a FANNER CHAPLET to fit the job.

THE FANNER MANUFACTURING COMPANY, CLEVELAND 1, O.

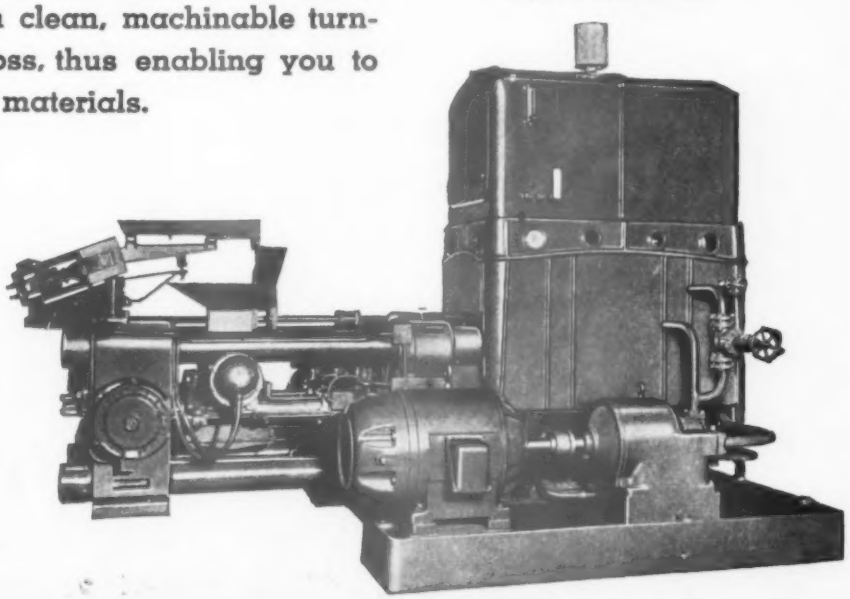
THE CANADIAN FANNER LTD., HAMILTON, ONTARIO, CANADA



Briquette to Conserve Resources!

Regardless of whether your scrap is composed of *brass, bronze, aluminum, magnesium, cast iron or steel* — or any alloy of these metals — you'll find it pays to employ a Milwaukee Hydraulic Press for briquetting the borings and turnings. Briquettes of ANY metal listed above make ideal scrap for remelting. They contain clean, machinable turnings which melt at a minimum loss, thus enabling you to reclaim the highest percentage of materials.

Illustration shows large Milwaukee Hydraulic Briquetting Press with 3½ ton-per-hour capacity. Four other sizes available.

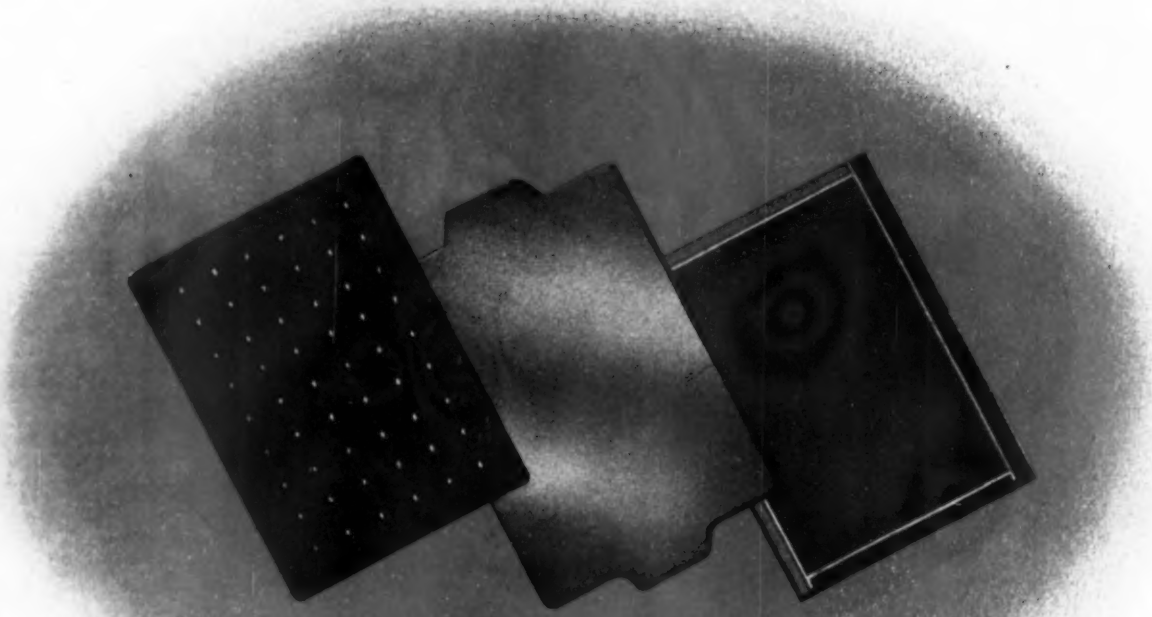


Plan Post-War Needs TODAY!

Conservation of materials will be even more important after the war due to the heavy losses resulting from this conflict. So, investigate briquetting possibilities today. . . . Write for further particulars.

MILWAUKEE FOUNDRY EQUIPMENT CO.

2238 W. PIERCE STREET • MILWAUKEE 4, WIS., U. S. A.



Perfect Castings

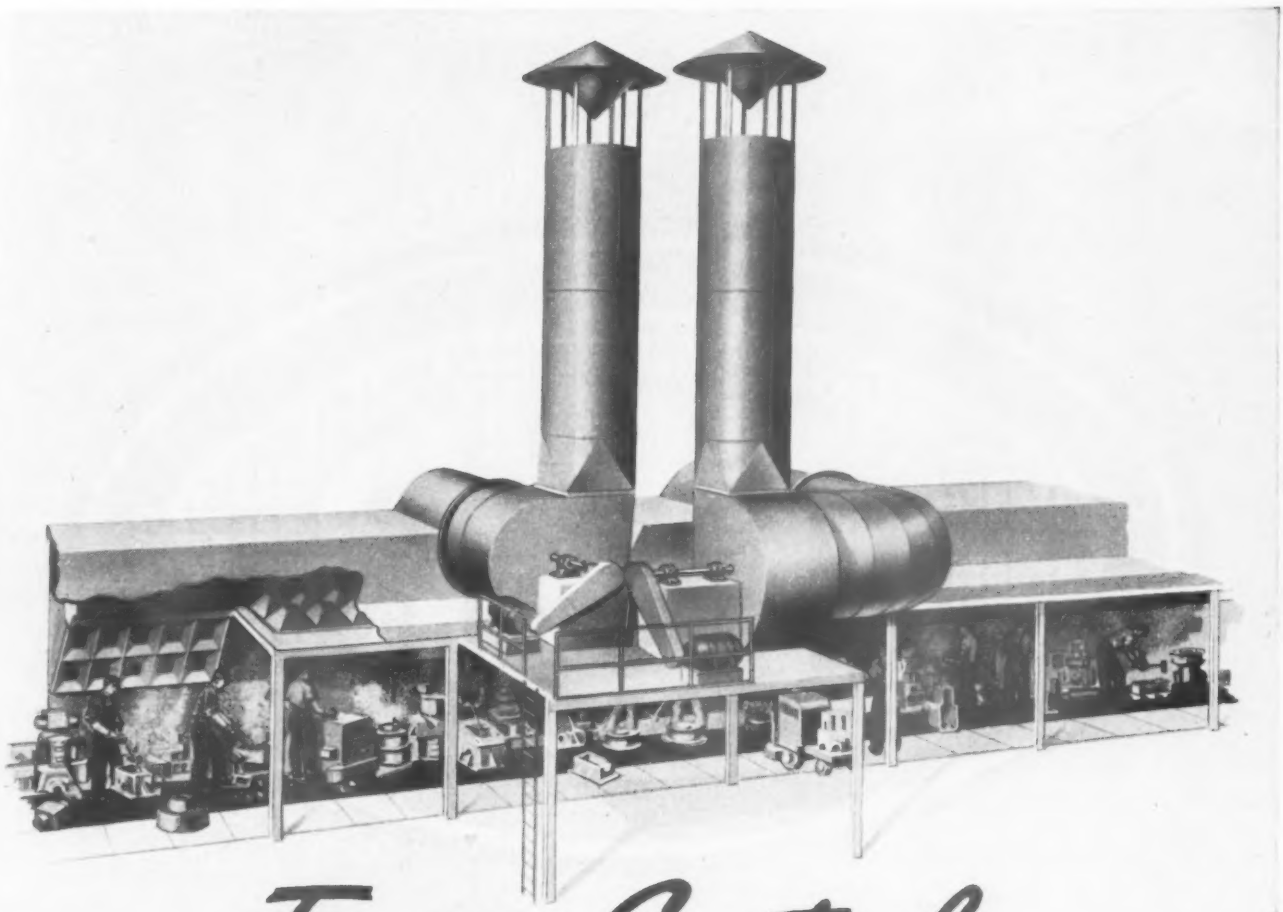
Require Best of Plates

Moltrup flattened steel pattern, core and bottom plates are made in all standard sizes and shapes or can be tailormade to fit any foundry requirement. Their fine quality will help guarantee fault-free castings in your plant.

★ ★ ★ **MOLTRUP** ★ ★ ★

STEEL FOUNDRY PLATES

MOLTRUP STEEL PRODUCTS CO., BEAVER FALLS, PA.
(PITTSBURGH DISTRICT)



Fume Control
for aluminum and magnesium foundries

● The fumes and smoke resulting from knocking cores out of aluminum and magnesium castings can be collected and positively removed from the building with Bartlett-Snow Fume Control equipment. As illustrated in the cutaway view above, these systems consist of groups of Bartlett-Snow's highly efficient pyramidal shaped collecting orifices (U. S. Pat. 121,704, July 30, 1940) mounted along the backwall and in a canopy which extends out beyond the knockout grating.

Castings to be knocked out are dumped on the grating from an industrial truck. The broken cores are dropped through the grating to a collecting hopper. The fumes and smoke, steam and dust are drawn off through the orifices. The men work in a clean cool air stream—seldom come into contact with even faint traces of smoke or fumes,—and have practically no restriction in their work.

Our recently completed 40-page Foundry Bulletin No. 91 illustrates many different types and applications of Bartlett-Snow Foundry Equipment,—and contains much information of interest to every foundryman. Send for a copy today!

THE C. O. BARTLETT & SNOW CO.

6201 HARVARD AVE. • CLEVELAND, OHIO

Engineering and Sales Representatives in the Principal Cities

FOUNDRY SAND, MOLD AND CASTINGS HANDLING • • DUST AND FUME CONTROL SYSTEMS • •

MSR

The Mark of Quality

Non-ferrous ingot of uniform analysis supplied by the plants of Michigan Smelting always bears the mark of quality.

Your specifications are adhered to absolutely. Production and laboratory controls of the latest, most modern type, assure highest possible accuracy.

More than fifty years of experience in the refining of non-ferrous scrap is your guarantee that you will get exactly what you specify when you do business with Michigan Smelting.

★ BUY WAR BONDS ★

MICHIGAN SMELTING & REFINING

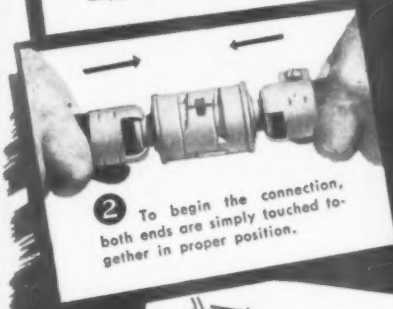
Division of BOHN ALUMINUM & BRASS CORPORATION, DETROIT 26, MICH.

General Offices—Lafayette Bldg.

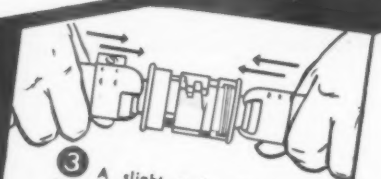
NON-FERROUS SCRAP METAL REFINERS FOR 50 YEARS

How SIMPLE, SAFE, SURE-LOCK Thor HOSE COUPLINGS

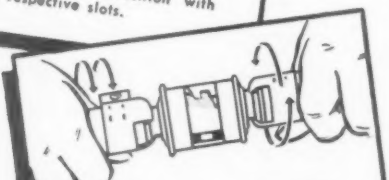
1 This is the Thor Air Hose Coupling about to be quickly assembled. Note the operation is so simple and easy that the operator needs only to hold the hose — not the coupling.



2 To begin the connection, both ends are simply touched together in proper position.



3 A slight push with both hands recedes the sliding sleeves against inner springs (phantom view) and moves the beveled jaws (gray) into position with their respective slots.



4 Presto!—with a slight twist the beveled jaws snap into position, the springs recoil, and the lugs (black) slide up and into positive-lock position.

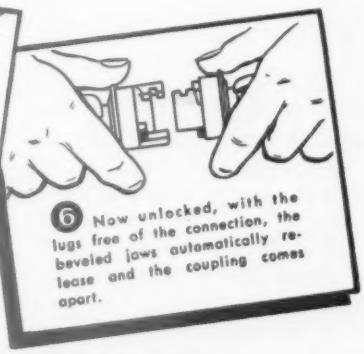
In this positive lock position the Thor Coupling cannot be accidentally disconnected. Thor design provides that the sleeves must be pulled in opposite directions to disengage the locking lugs—so that if one hose end strikes a snag and the sleeve slides back, the sleeve on the opposite side stays in position to retain the connection.

SAVE TIME AND MONEY ON ALL JOBS...

Here, in six simple steps, is how Thor Hose Couplings put to work with all air tools in your plant can save you both time and money . . . and why they will prove more popular with operators because of their simplicity and fool-proof safety features.

Thor couplings are interchangeable between all sizes and combinations up to ¾ inches, inclusive. Each hose end is identical with the other—no right or left . . . no male or female—making a universal coupling that fits *every* job!

5 Now, to disengage the Thor coupling, all the operator does is pull back the spring-enclosing sleeves to release the lugs from locking position.



6 Now unlocked, with the lugs free of the connection, the beveled jaws automatically release and the coupling comes apart.

SEND THIS COUPON NOW for complete information

Thor Portable Pneumatic and Electric Tools

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO 6, ILL.

Branches in Principal Cities

GENTLEMEN:

Please send the number of copies indicated below of Bulletin P-1050 for distribution to those in our organization who will be interested in complete information about Thor Hose Couplings.

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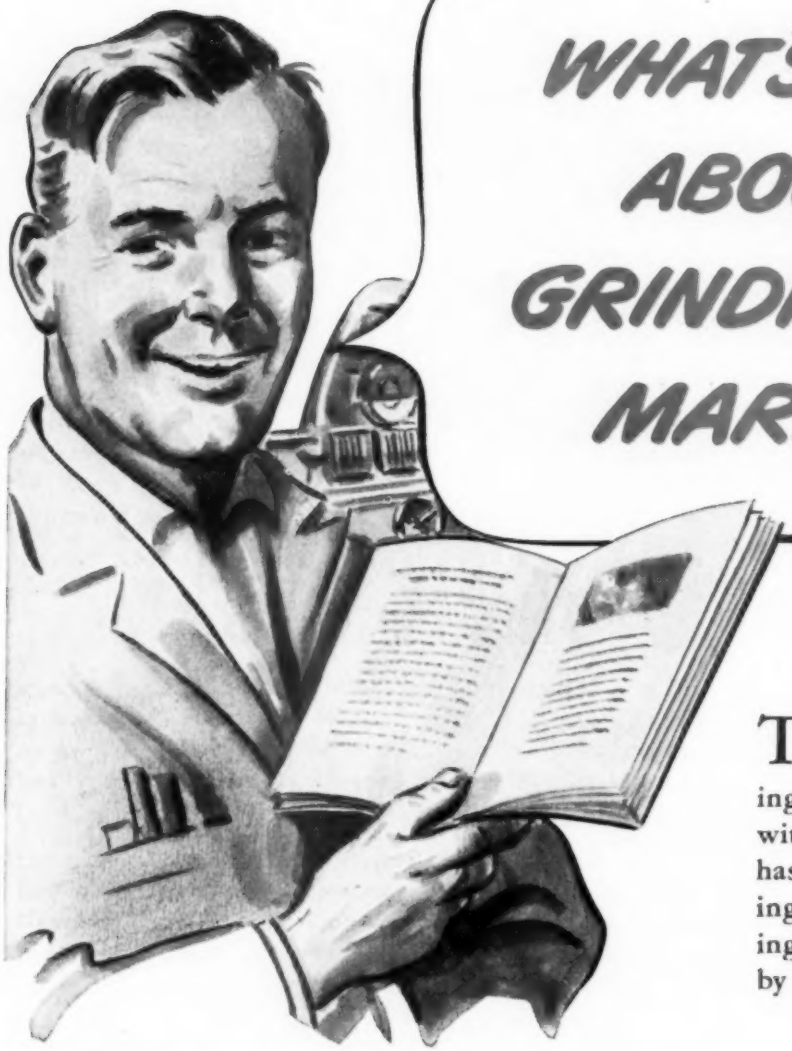
COMPANY .....

ADDRESS .....

CITY ..... ZONE .... STATE ..... NO. OF COPIES .....



WHAT'S ALL THIS ABOUT NEW GRINDING WHEEL MARKINGS!

THAT'S right—from now on it's going to be a lot easier to get the right grinding wheel for the job! Carborundum, along with all other makers of grinding wheels, has adopted a new system of wheel markings. ✳ The new system is one of marking only. So wheels with similar markings by different makers may not grind alike.

This new book gives you a clear understanding of the new markings on Wheels by Carborundum and the grades they indicate. It's also full of information on the proper selection, identification, specification, use and care of grinding wheels.

But it does more than that! It includes additional information about the complete Carborundum line, the most complete line of abrasives made and sold under one brand name. It is one of the most useful manuals on abrasives ever published! To get your copy promptly, fill out the coupon and mail today to The Carborundum Company, Niagara Falls, New York. And for help with *any* abrasive problem, consult your Carborundum Representative!

✳ *Effective soon, these new markings will appear on all Grinding Wheels sold by Carborundum. Because so many of these wheels are in use in industry, it may take a little while before the transition is complete. For as long as is necessary to help our customers, Grinding Wheels by Carborundum will carry both the old and new markings.*

YOU NEED THIS BOOK TO SELECT THE RIGHT GRINDING WHEEL FOR THE JOB!

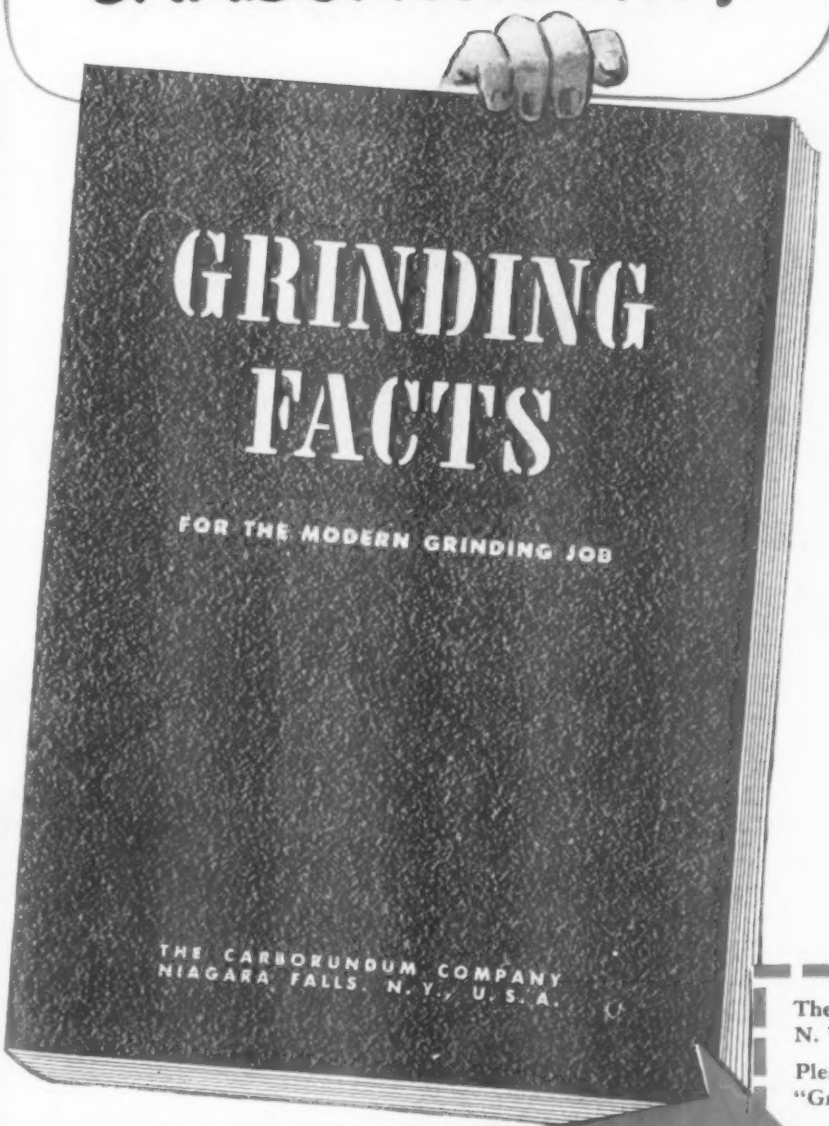
THERE IS A

CARBORUNDUM

TRADE MARK

PRODUCT FOR EVERY ABRASIVE APPLICATION

IT'S ALL IN THIS NEW BOOK BY CARBORUNDUM!



HIGHLIGHTS FROM "GRINDING FACTS"

1. The fundamentals of Wheel Marking
2. The new Carborundum Wheel Markings
3. Factors to consider when selecting a Wheel
4. Care and Handling of Grinding Wheels
5. The 9 Standard Wheel Shapes
6. Basic Grinding Wheel Functions
7. Types of Grinding Operations
8. Diamond Wheels
9. Green Grit Wheels
10. Mounted Wheels
11. Thread Grinding Wheels
12. Cutting-Off Wheels
13. "MX" Wheels
14. Tool Room Sticks
15. Coated Abrasives
16. New Gradings
17. Wheel Speeds

CARBORUNDUM

MAIL COUPON TODAY FOR YOUR FREE COPY!

The Carborundum Company, Niagara Falls, N. Y., Dept. F.

Please send me my free personal copy of "Grinding Facts."

Name.....

Firm.....Title.....

Address.....

(Carborundum is a registered trade mark of and indicates manufacture by The Carborundum Company)

Standard Test shows G-IRON* more fluid by 30 to 35%

Standard fluidity test of a G-Iron casting, containing 2.08% silicon, 3.56 total carbon, measures 52 to 59 inches compared with ordinary iron which flows from 30 to 40 inches.

Greater fluidity of G-Iron and reduction in internal shrinkage help solve the problem of casting thick and thin sections without the danger of cold shuts and shrink pockets. Reduces scrap losses.

*G-Iron is graphitized pig iron. These photographs show its grain structure. *Circle:* Photomicrograph etched—100 diam. Manufactured under U. S. and Canadian patents.

TONAWANDA IRON CORPORATION

NORTH TONAWANDA, N. Y.

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

MAHON

Hydro-Foam

DUST COLLECTORS

Safest, Surest Principle of Dust Elimination

Ready—AT A MOMENT'S NOTICE—

TO SWITCH OVER TO PEACETIME PRODUCTION

Mahon *Hydro-Foam* Dust Collectors have done an outstanding job in assisting industry to achieve a truly amazing war production record. Take, for example, the installation shown above—part of a huge battery of 20 Hydro-Foam units—used to effectively and economically remove the dust from machining operations on aircraft propellers. Because working areas have been kept clear of dangerous aluminum dust, production has been greatly accelerated. The health of workmen has been protected. Of vital importance, also—from a strictly dollars-and-cents point of view—is the fact that no monetary loss incurs. This same dust-collecting system can be converted to peacetime operation—without delay—and with but minor expense for possible changes in duct work.

The assistance of Mahon engineers is available to any plant now operating a Mahon *Hydro-Foam* Dust Collecting System in adapting it to after-the-war production—or to any plant that requires a superior dust collecting mechanism for both immediate use and for peacetime operation.

Mahon *Hydro-Foam* Dust Collectors are manufactured in standard units of various capacities which can be used singly or in multiple to meet any requirement.

THE R. C. MAHON COMPANY

DETROIT 11 — CHICAGO 4

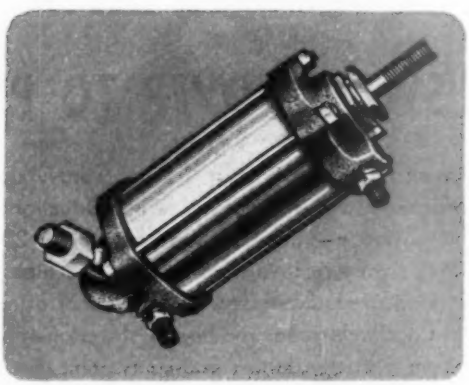
Manufacturers of Metal Cleaning Machines • Rust Proofing Machines • Hydro-Filter Spray Booths • Ovens of All Types • Filtered Air Supply Units • Hydro-Foam Dust Collectors—and Many Other Units of Special Production Equipment—including Complete Finishing Systems

Air, controlled and at work puts the "sock" in a windsock. Compressed air, Schrader-controlled, puts a "sock" into industrial operations, makes shorter, easier, safer work of them.

Schrader Air Controls cut costs, save time and labor by reducing or eliminating tiring and hazardous muscular operations. Using thrifty controlled intermittent air blasts instead of wasteful continuous flow, Schrader controls also enable you to enjoy the advantages of Schrader devices without—in many cases—adding to your existing compressor capacity.

The first cost of Schrader Air Controls and devices is so small and the return on the investment so consistently high that you can hardly afford to risk a return to reconversion production schedules and costs without serious consideration of them.

A highly practical example of Schrader air devices is the Schrader Air Cylinder, an air "muscle" with a thousand uses. Schrader Air Cylinders do tough, tiring, lifting, lowering, pushing or pulling jobs better, faster and cheaper than they can be done manually.



THERE ARE HUNDREDS OF USES for Schrader Air Cylinders. Cost very little. Easy to install and operate with Schrader Control Valves. Many types, single or double-acting, and in a variety of lengths, diameters and mountings for every purpose.

Send for the new Air Cylinder Bulletin A-10Q and see the many Cylinders, Operating Valves, etc., you can use to save the time and energy of your workers.

Air Valves 2, 3, 4-way • Blow Guns • Machine Operating Air Controls • Quick-acting Couplers • Safety Operating Controls • Air Ejection Sets • Hydraulic Gauges

Schrader
REG. U.S. PAT. OFF.
CONTROLS THE AIR

MADE BY THE MAKERS OF SCHRADER TIRE VALVES AND GAUGES

A. SCHRADER'S SON, *Division of Scovill Manufacturing Company, Incorporated,* **BROOKLYN, NEW YORK**

This is what one SMZ Alloy user thinks of this Ladle Addition alloy

"I have used many types of graphitizers, but in my opinion, SMZ Alloy is the most effective. To us, it is most desirable for the following reasons:

(1) It has a low melting point, which means thorough solution when added to the ladle.

(2) It requires less amount to do the work.

(3) It produces a fine-grained machinable iron.

(4) It reduces chill and hardness, and at the same time, increases tensile strength. Other graphitizers reduce hardness and strength together. This is the most remarkable property of SMZ Alloy to me, and in my experience, a very unusual and most desirable one."

Have you tried SMZ Alloy in your Iron?

You can get further information on SMZ Alloy by writing for the booklet "SMZ Alloy and Its Uses as a Ladle Addition to Cast Iron." If you need technical help in its use ask the nearest Electromet field metallurgist. They are located in New York, Pittsburgh, Detroit, Cleveland, Chicago, Birmingham, and San Francisco.

BUY UNITED STATES WAR BONDS AND STAMPS

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet Trade Mark
Ferro-Alloys & Metals

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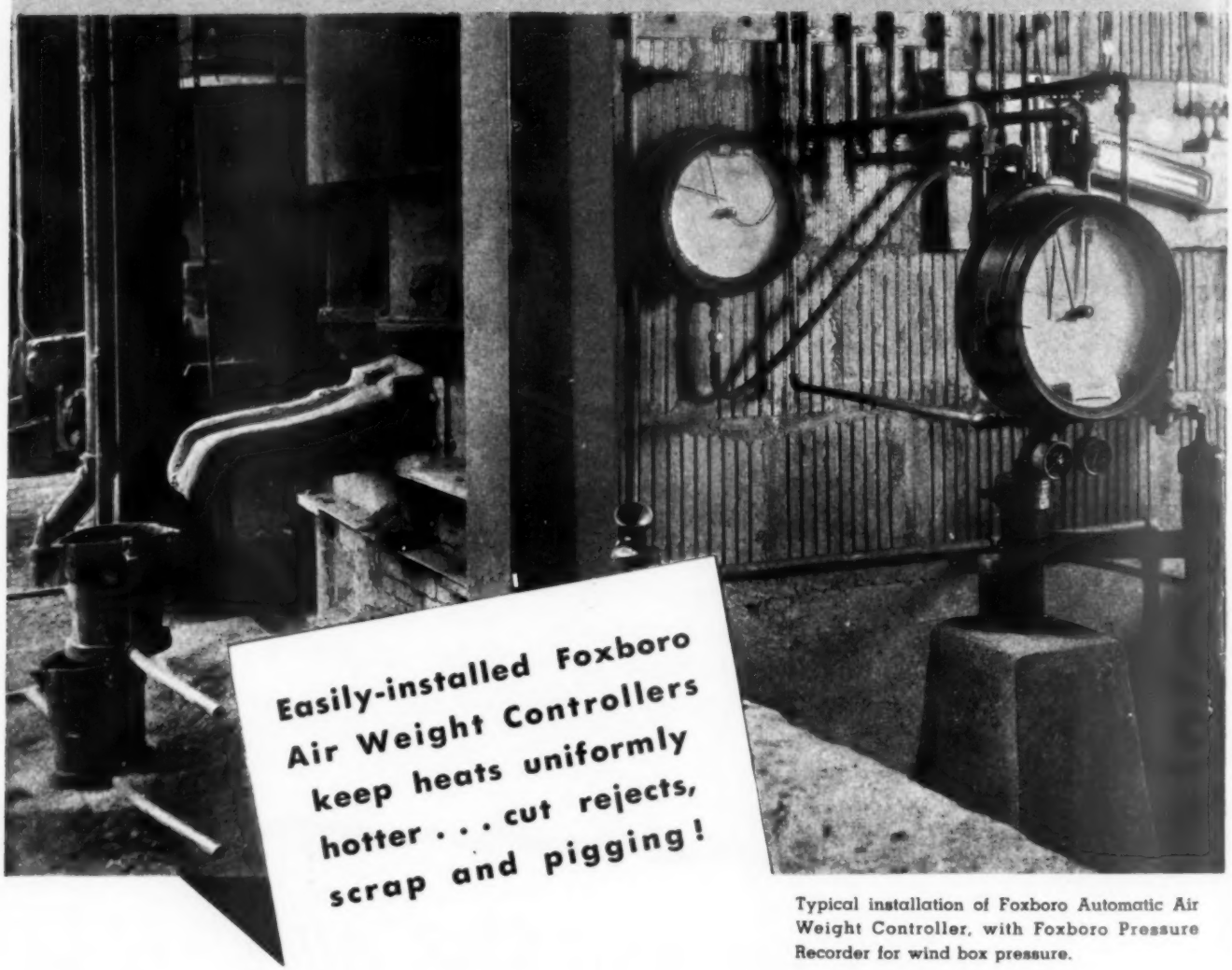
SPEEDIEST SHORT-CUT

to Higher, Better Foundry Output!



Typical installation of Foxboro Automatic Air Weight Controller, with Foxboro Pressure Recorder for wind box pressure.

Here's a simple accessory installation for cupolas that is helping foundrymen step-up their capacity, save waste and improve quality of output. It's the Foxboro Air Weight Controller . . . a precision automatic instrument that exactly controls the supply of air *by weight*, regardless of changing atmospheric temperature or pressure!

Immediate, permanent benefits include: uniformly hotter iron, without burning; higher quality castings; fewer rejects; and elimination of pigging. Operation is completely automatic, too. All you do is set the control pointer on the Foxboro Air Weight Controller at the desired rate of flow, before you start the run. No further attention is necessary.

Air Weight Controllers are one of Foxboro's many original developments in instrumentation to cut industrial costs through better production. You can verify their performance by talking with users in your vicinity. (Names supplied on request).

Write for Bulletin B-268 on Foxboro Air Weight Controllers, or detailed information on any other type of instrumentation you need. **The Foxboro Company, 32 Neponset Ave., Foxboro, Mass., U.S.A.** Also Montreal, Canada. Branches in principal cities.

RECORDING · CONTROLLING · INDICATING

FOXBORO
REG. U. S. PAT. OFF.
Instruments

There's a Hidden Gold Mine in your USED CORE WIRE!

RECLAIM IT WITH KANE & ROACH CORE WIRE STRAIGHTENERS

Savings up to $150 a month are often reported by enthusiastic users of Kane & Roach Core Wire Straighteners! Don't neglect this hidden source of cash! Your used wire—even if it's badly bent—can be restored over and over again with these fast-working, economical machines. Now—when conservation of all metal is a vital factor in war-industry, Kane & Roach Straighteners fulfill a more important need than ever. Kane & Roach machines not only save valuable core wire but they pay for themselves so fast that scores of foundrymen have reordered as many as three or four after a short trial of one.

Here's Why Kane & Roach Is Your Best Bet!

There's an excellent reason why Kane & Roach Straighteners are in such demand—that's because they're built to do a long-term heavy-duty job, and do it better, faster and cheaper. This claim is substantiated by foundrymen everywhere—who know and rely on Kane & Roach, the company that has specialized in designing and building high-quality straighteners for the steel industry since 1887. You owe it to yourself and to the industry to invest in a K&R machine for superior straightening of badly-needed core wire.

The NEW K & R CORE WIRE STRAIGHTENER

Works Better, Lasts Longer, because . . .

- 3 ADDITIONAL straightening rolls plus the pinch rolls, all of hardened steel.
- Roll gears are cut-steel, hardened.
- Drive gears run in oil.
- Maximum safety—guard encloses all moving parts.
- Pressure-release cam handles prevent jamming.
- Motor drive shielded from grit.
- Cabinet base encloses and protects sturdy, high-power motor.
- Extraordinarily long wear for all parts.
- Cut-off can be furnished for straightening and cutting new wire from the coil.

K&R

Cash in NOW! Send today for our new circular 58-B—the first step to savings.

KANE & ROACH, Inc., Syracuse, N. Y.

I want to know more about K&R new core wire straighteners. Send me Bulletin 58-B, without obligation. My sizes of wire are: .....

Company .....

Individual .....

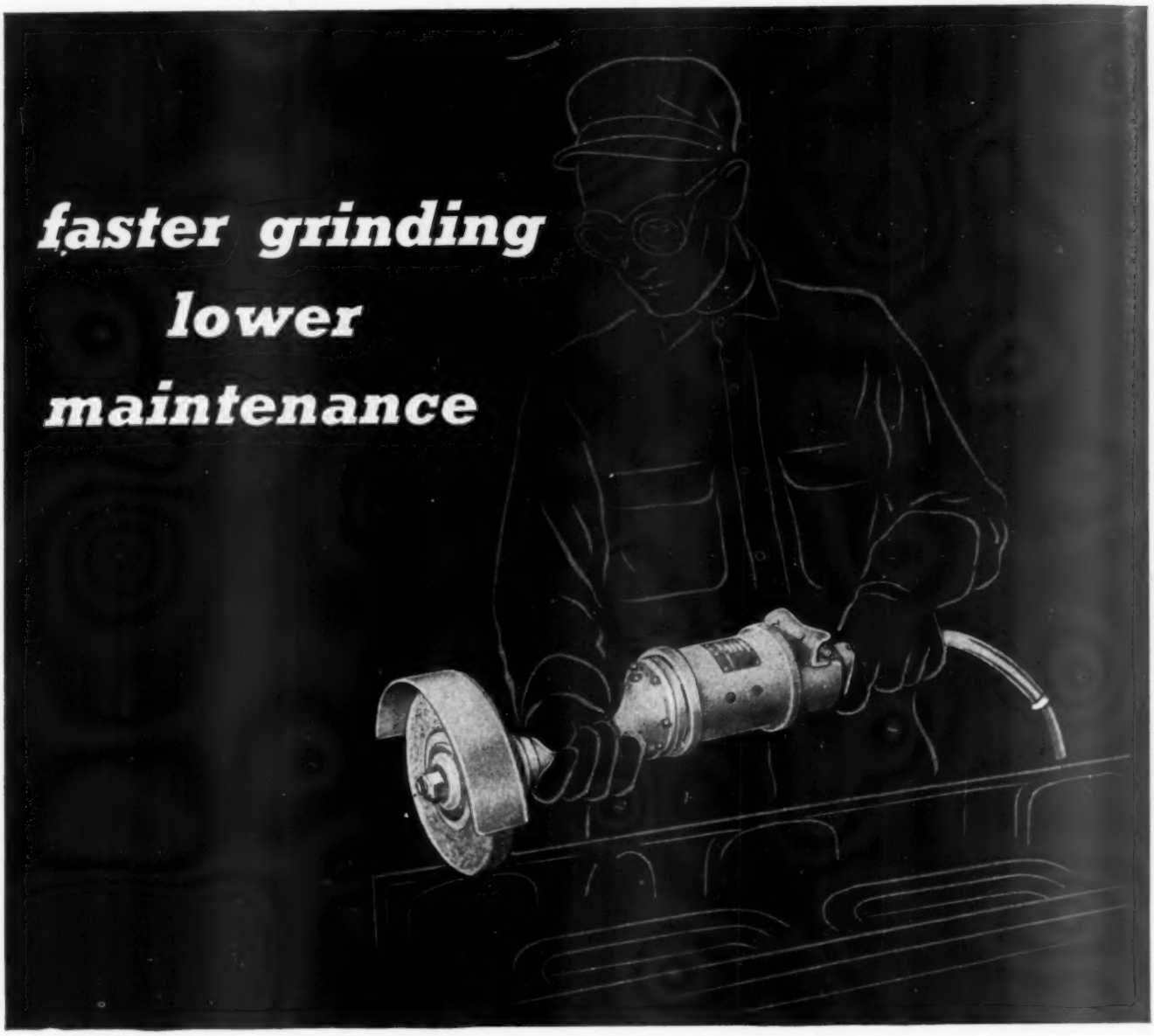
Street .....

City and State .....

KANE & ROACH

SHONNARD AND NIAGARA STS.

SYRACUSE, N. Y., U.S.A.



CP HICYCLE ELECTRIC GRINDERS

CP Hicycle Electric Grinders with their high sustained speed, light weight and perfect balance not only remove more metal in less time but also materially lengthen the life of the grinding wheels. Plant records show that CP Hicycle Electric Tools have the lowest maintenance costs of any type of portable tools. For complete information write for Catalog 900.

The CP line of Hicycle Portable Electric Tools includes Grinders, Sanders, Buffers and Polishers, Drills, Reamers, Screw Drivers, Nut Runners, Stud Setters, Tappers, Radial Arms, Accessories.

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PNEUMATIC TOOLS
ELECTRIC TOOLS
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General Offices: 8 East 44th Street, New York 17, N. Y.

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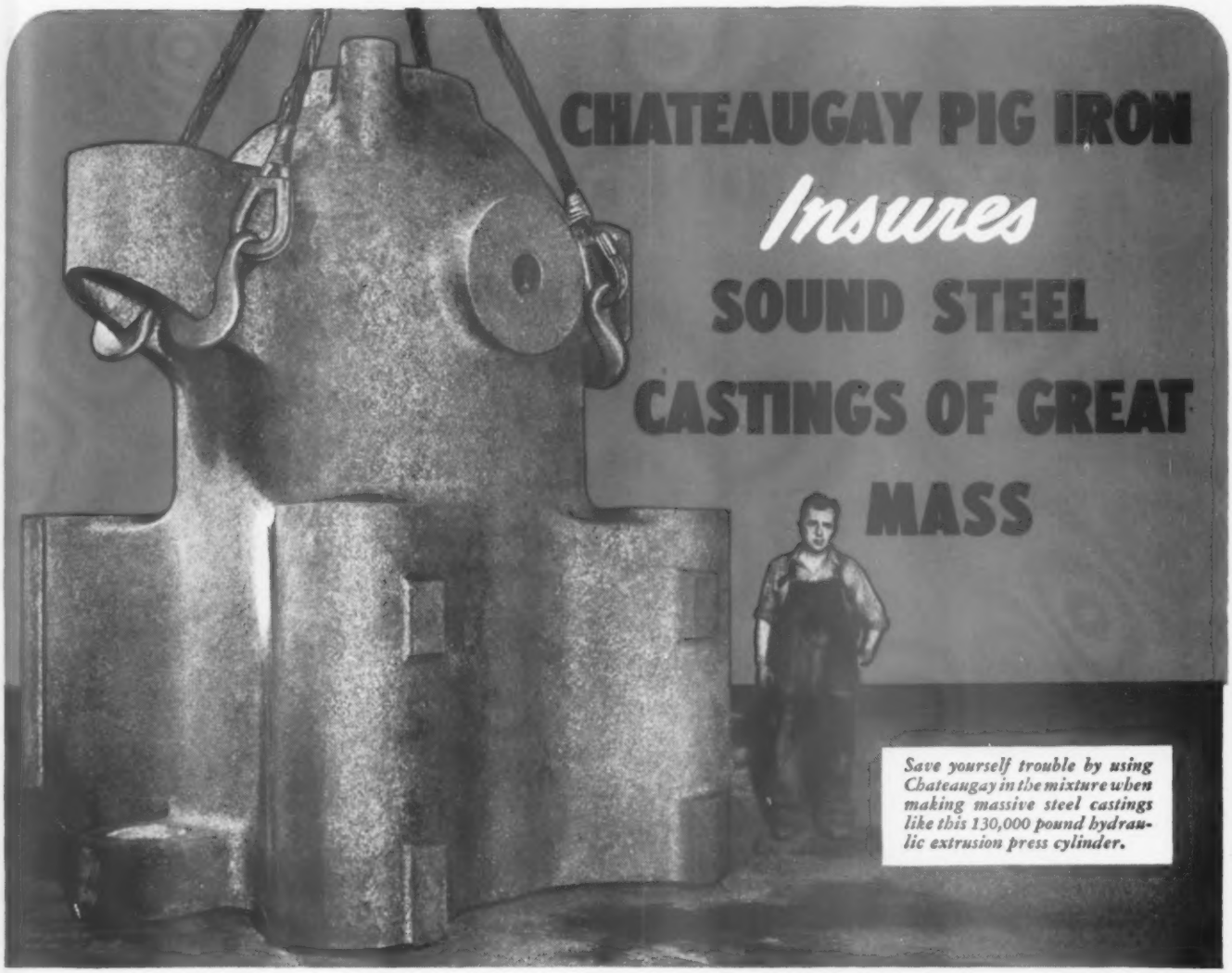
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES


CHATEAUGAY PIG IRON
Insures
SOUND STEEL
CASTINGS OF GREAT
MASS
Save yourself trouble by using Chateaugay in the mixture when making massive steel castings like this 130,000 pound hydraulic extrusion press cylinder.

Chateaugay is a low-phosphorus, copper-free iron. Any foundry using it can improve physical properties of castings and thus help assure *absolute soundness, close grain structure, and uniform cross section density,* even in castings of great mass. This metallurgical and foundry-proven fact has saved foundries many dollars—yes, and many headaches, too!

To be assured of sound castings every time is mighty important, but Chateaugay has other equally important features to recommend it. Take difficult castings that have tricky, complicated designs, or castings with joining light and heavy sections. Chateaugay can save you money and trouble, because it fills the mold completely and sets rapidly.

In addition Chateaugay is highly and uniformly machinable, and can be turned, milled, drilled, or otherwise machined freely and economically. It also provides hard wearing surfaces that are resistant to heat and acids.

You might think that the features we've mentioned are enough to recommend any pig iron—normally this would be true, but not in the case of Chateaugay. You still haven't heard the whole story about this remarkable pig iron, and if you are not already enjoying its many trouble-free advantages, write us today.

A Republic Pig Iron Metallurgist will gladly call on you to discuss the possibilities of Chateaugay in your foundry.

REPUBLIC STEEL CORPORATION
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Berger Manufacturing Division • Culvert Division
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Republic PIG IRON

"CHATEAUGAY"	"REPUBLIC"	"PIONEER"
Low-Phosphorus, Copper-Free	(Northern) Foundry, Basic and Malleable	(Southern) Foundry and Basic

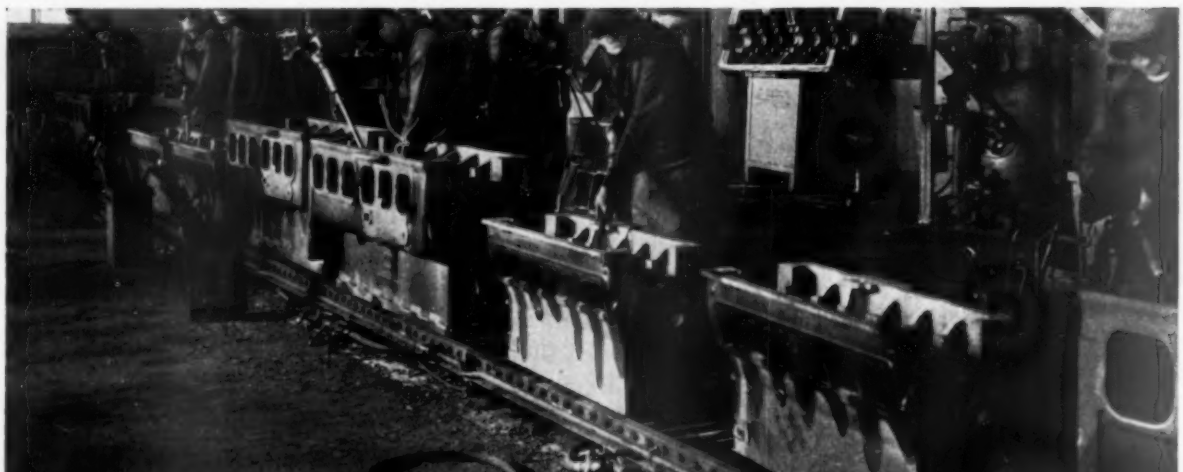
ALSO TRUSCON FOUNDRY FLASKS—REPUBLIC CORE WIRE—FOUNDRY NAILS

Two of the old standbys

Vulcan Oil-Core Blacking

Spreads smoothly, does not run or sag and holds firmly to the core regardless of the oily surface. It is used extensively on port, jacket, hub, bushing and burner cores.

Vulcan Automotive Blacking



This Blacking is suitable for high production methods. It peels the sand quickly from the smooth surface of cylinder blocks, heads, and transmission housings.

There are scores of other McCormick Blackings . . . each for a specific duty

J. S. McCORMICK CO.
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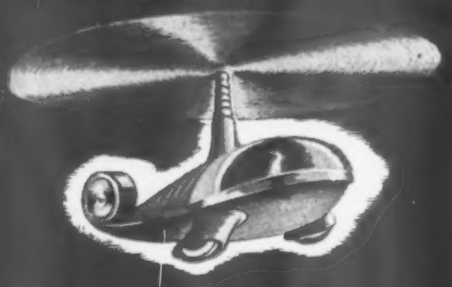

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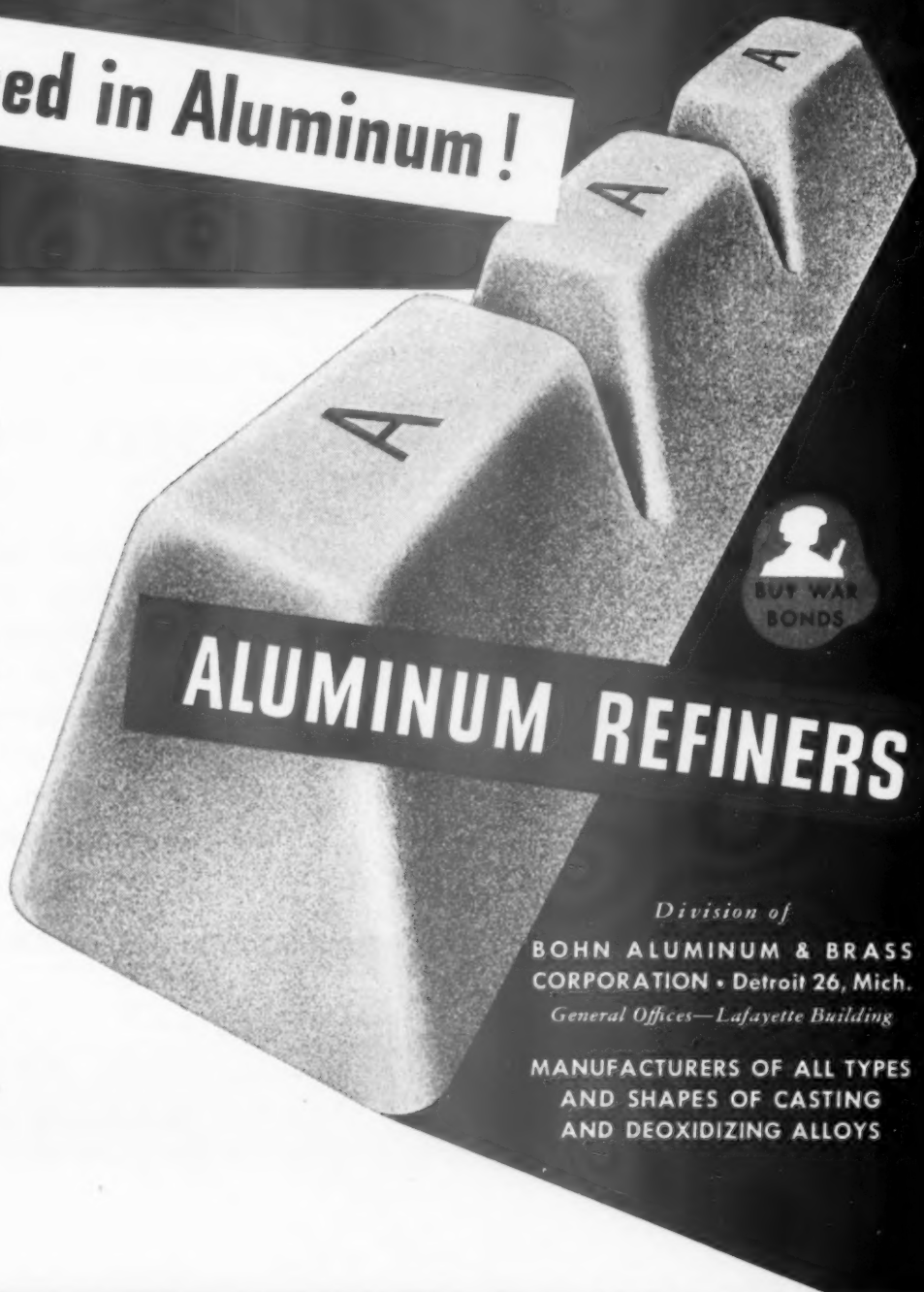

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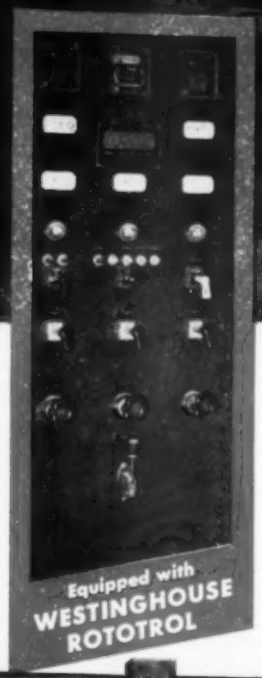

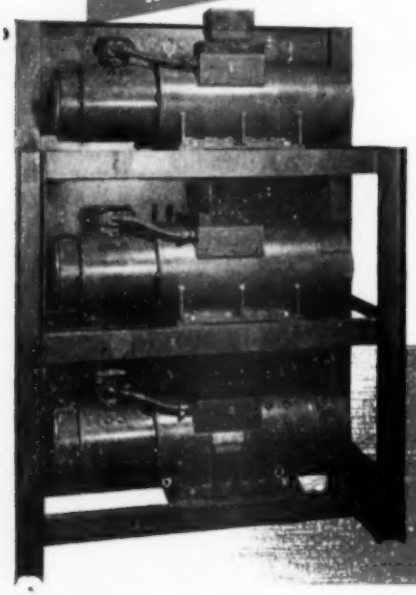

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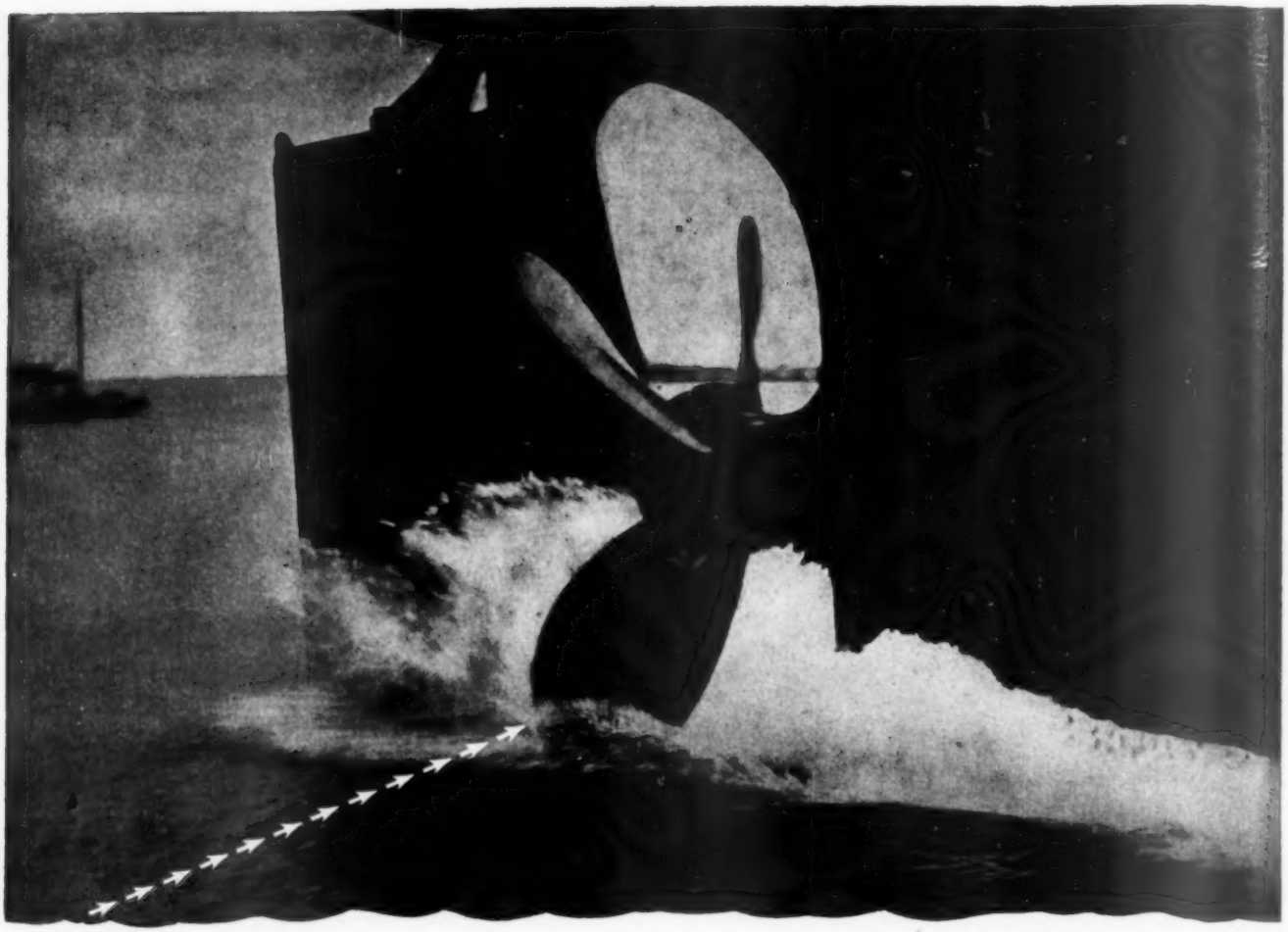

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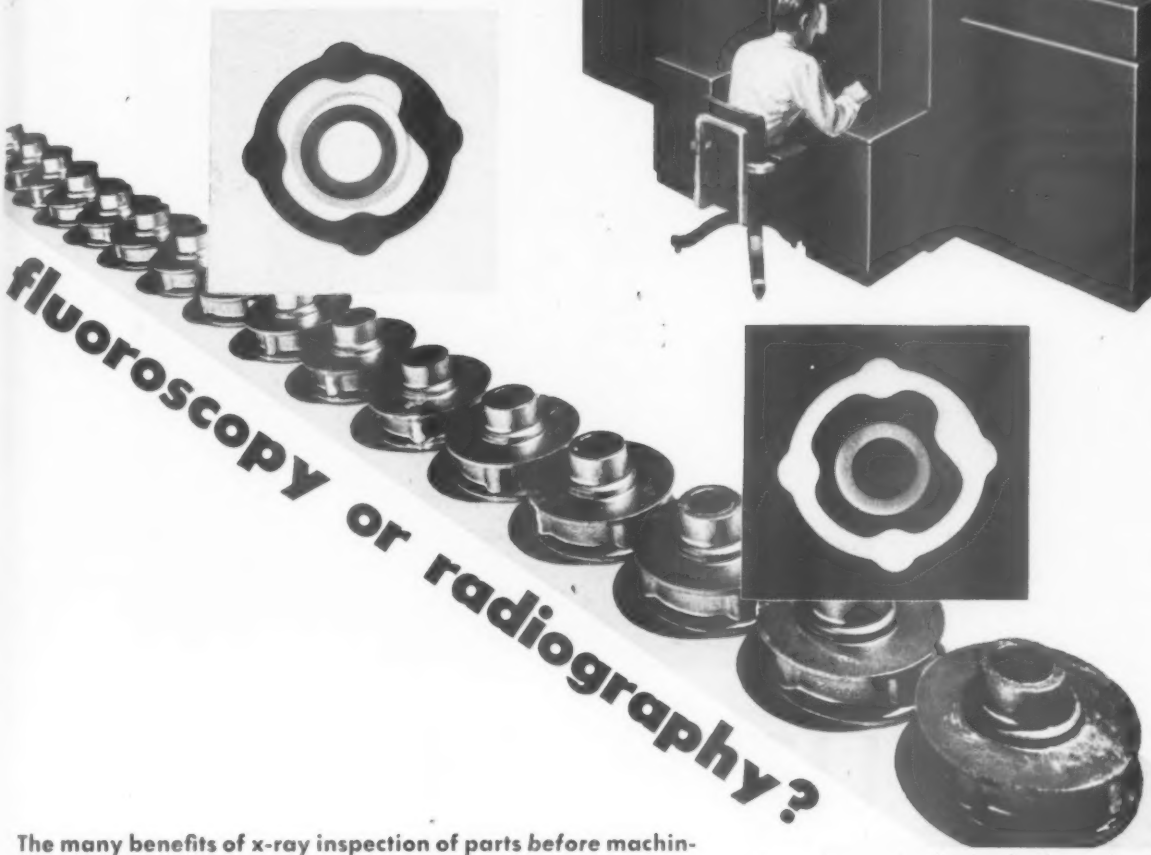

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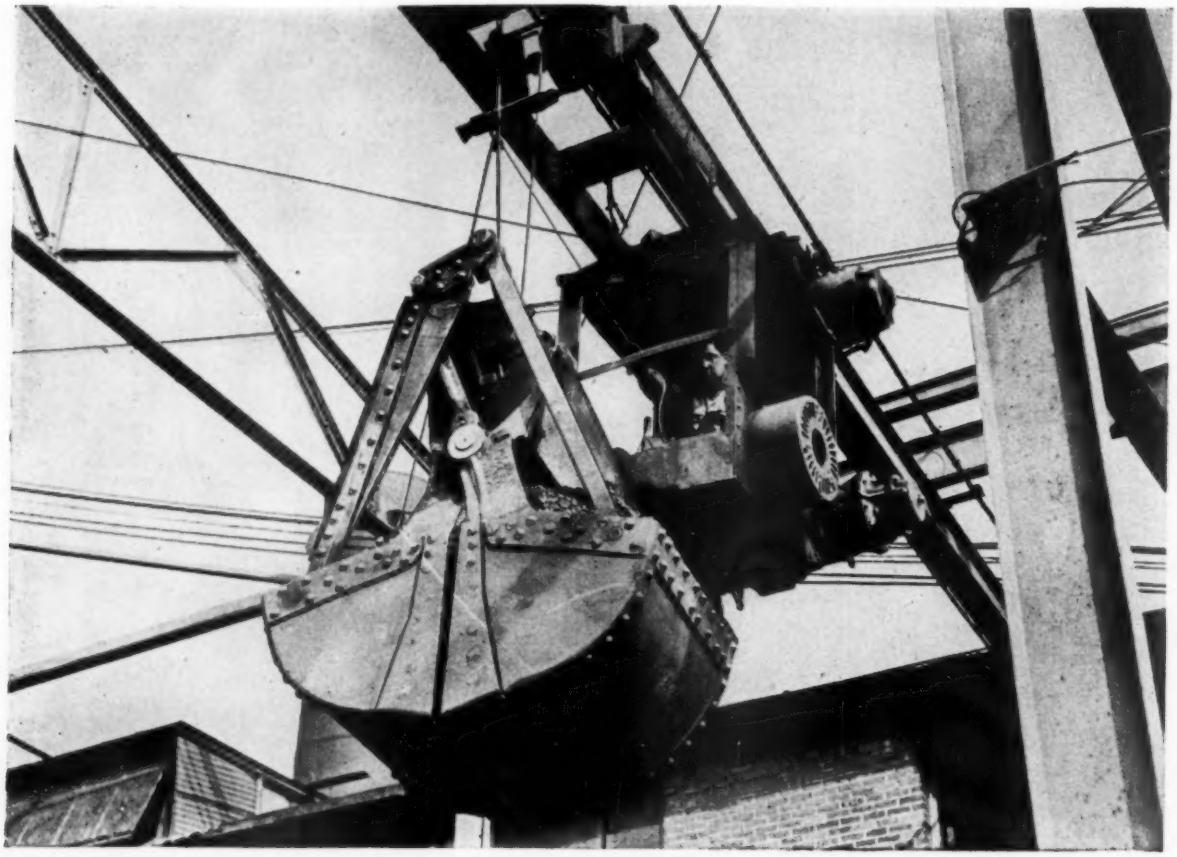

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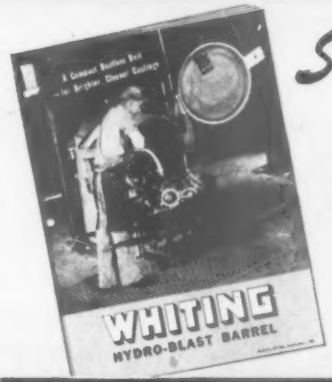

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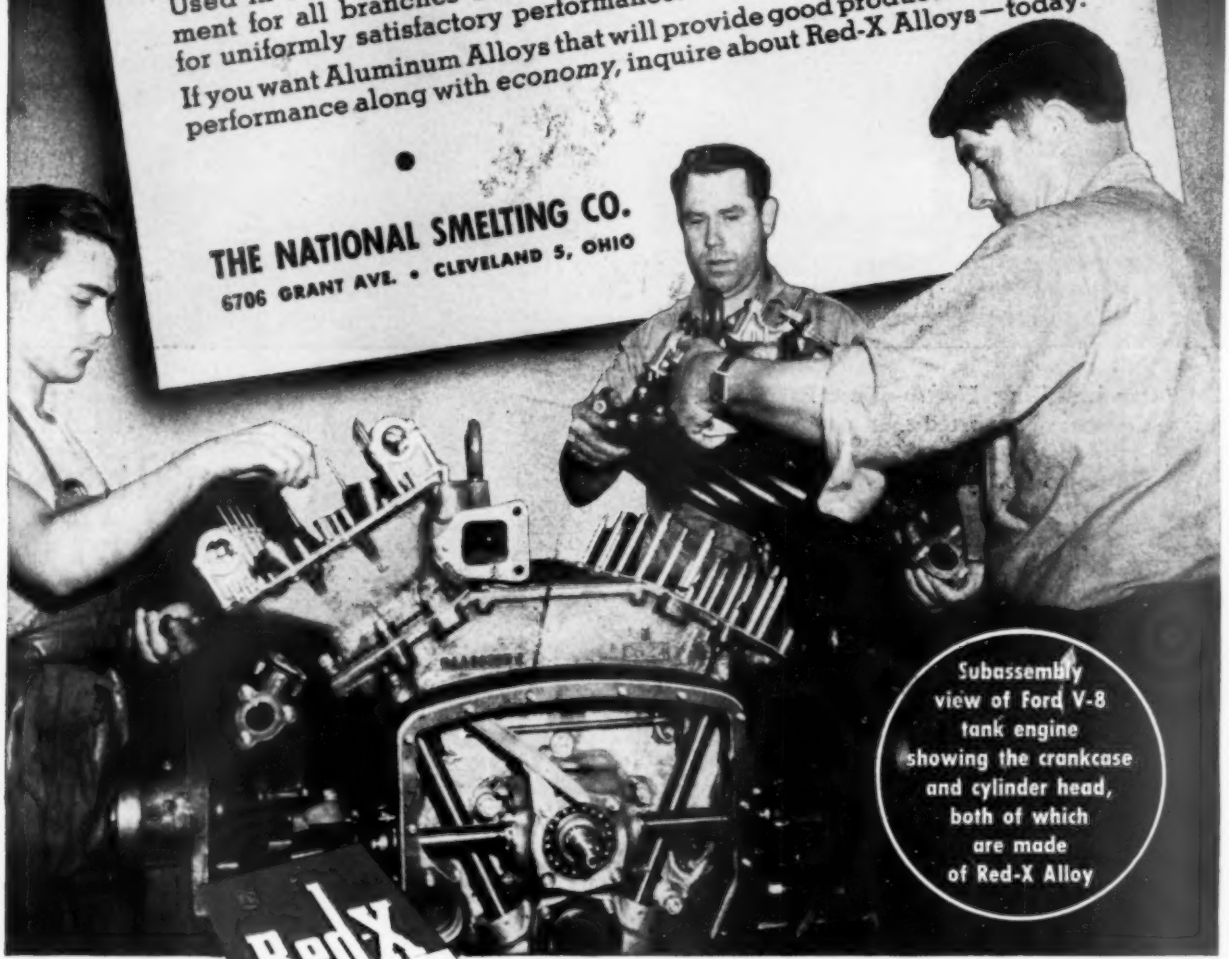

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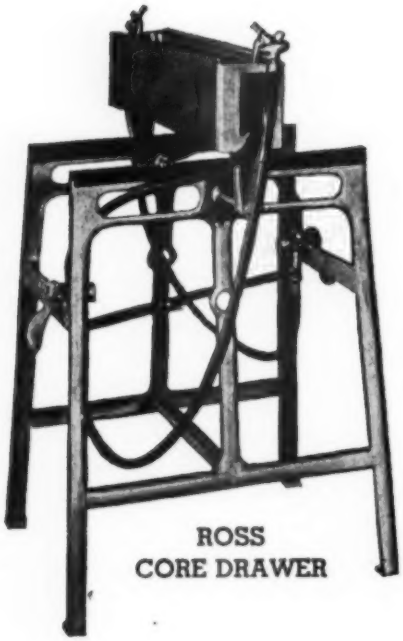

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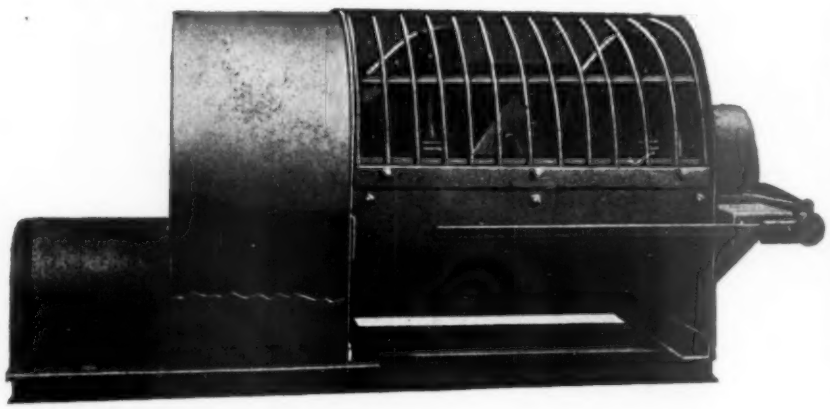

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Will Gray Iron Industry Retain Gains Of War Production Period?

THE successful annual meeting of the Gray Iron Founders' Society in Cincinnati has emphasized again tremendous progress on the part of the industry in gaining acceptance for gray cast iron in the war effort. Three years ago when conversion to war production was just getting under way, considerable concern was expressed over the probable future war demand for gray iron castings. Most people in the various government agencies seemed to believe that we were to fight a steel war and that gray iron had no place in the picture. Competing materials had become so firmly entrenched in the minds of military men that the gray iron industry itself seemed to lack confidence in the possibility of increasing war uses of gray cast iron.

Watts Rose, executive vice president of the society, was one of the few who expressed a more optimistic viewpoint. At the annual meeting in 1941, he pointed out that the demand for gray iron castings should increase considerably as the defense effort accelerated, due to inability of other methods of fabrication to meet war demands, and to the availability of gray iron for many purposes not yet recognized by the government. The accuracy of this prediction has been confirmed by more recent events. Because of its basic character in all engineering production, and because of improved properties developed through research and improvements in foundry practice, gray iron has filled a need in the war production effort little dreamed of when the national emergency first became apparent. Nearly everyone in the country today is familiar with the fact that certain types of gray iron castings have been placed near the top of the list of critical items necessary for winning the war.

Blame for the lack of acceptance of gray iron castings early in 1941 by the military services rested almost entirely with the gray iron foundry industry. While producers of competing products were telling the story of availability to the military services and others in Washington gray iron foundrymen seemed content to go their individual ways, serving old customers, and failing to realize that soon the government would provide their only customer. Little thought was given to a co-operative effort designed to lift the acceptance of gray iron castings to the plane of certain other materials. This is illustrated by the fact that early in 1941, the membership of the Gray Iron Founders' Society was only 183, making it difficult for the officers of the group to claim representation for the entire gray iron foundry industry.

But early in the summer of 1941, two events transpired which have had a marked effect on the fortunes of the gray iron foundry industry and the growth of the society since that time. A group of far-seeing gray iron foundrymen got together, recognized the need for more direct action, and pledged a fund of $20,000 to finance activities of the society in connection with war problems. The second event was the use of these funds to open an office of the society in Washington. From that time on the various departments of the government began to have frequent contacts with the gray iron foundry industry and to learn of the value of gray cast iron as an engineering material. Since that time, the officers of the society and Messrs. Rose, Caldwell, Edgar and Mullen have accomplished wonders in serving the gray iron industry and in furthering the use of gray cast iron in the war. As a result, the society membership today is 730, and the organization does speak for the industry.

In the postwar period will the gray iron industry profit by the trials and tribulations encountered in conversion to war production? Will it benefit from the mistakes of the past few years and go forward to greater service to American industry and the millions of human beings in this country? Or will it return to the old ways and the old difficulties? To go forward, several factors must be considered carefully.

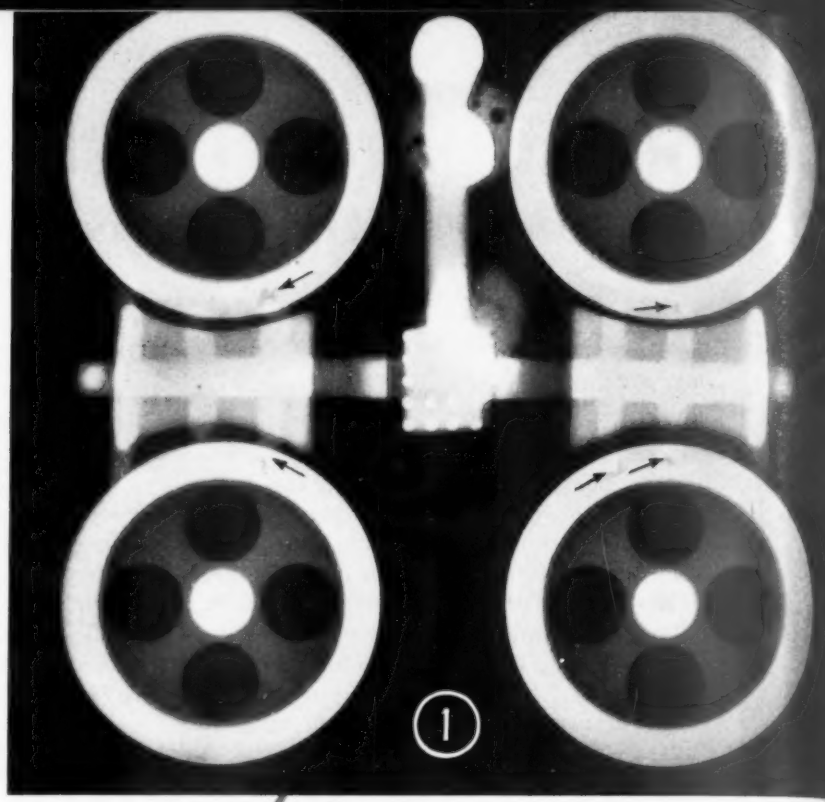
The postwar foundry will be a greatly improved plant compared with the prewar variety. Obsolescence and demands of labor for improved working conditions will provide the necessary incentives.

The postwar product must be better than prewar castings. This does not mean higher tensile strengths and developments in other physical properties, although that will be the trend. But it does mean more uniformity, more dependability. Buyers of castings must have confidence in the product; they must know that the castings are sound, uniform and that they meet the required specifications. This is probably one of the most important problems facing foundries today.

Postwar selling must be intelligent, progressive and modern if it is to meet the greatest competition in history.

While the gray iron foundry industry has found the Gray Iron Founders' Society altogether indispensable during the war period, the need for leadership provided through the society will be even greater in the days ahead. The industry should see that the society continues to grow and prosper.

Frank G. Steinbach
Editor



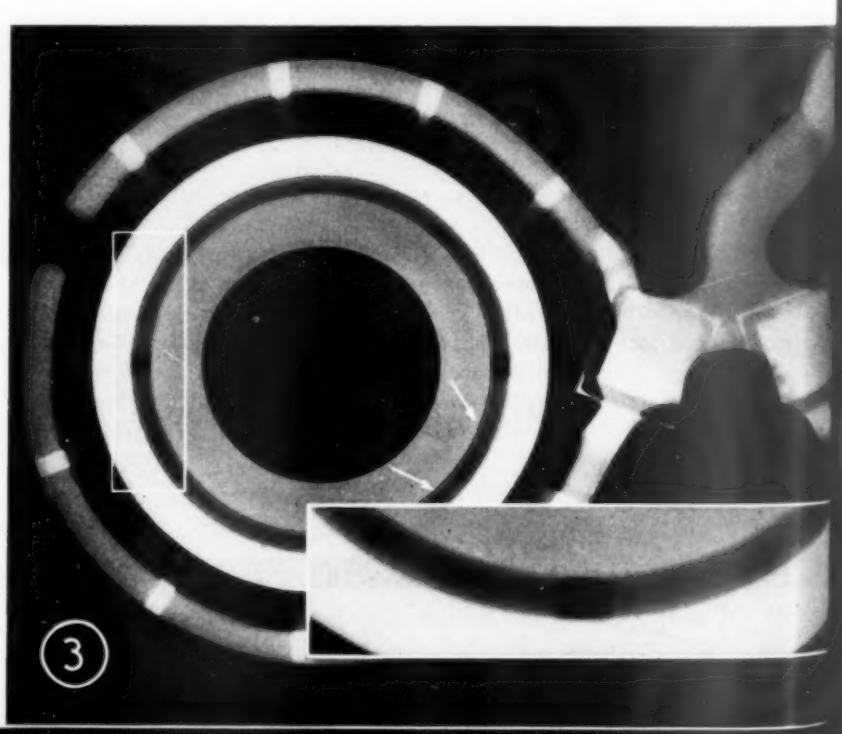
Radiography... Key to Better

RADIOGRAPHY was knocking timidly at industry's door as far back as 1927. Although Roentgen's first experiments with the rays he discovered were in taking pictures *through* metal, it seems that a more urgent requirement for the art lay in medical diagnoses. At any rate, the potentialities of x-ray as applied to industry were not felt until the late twenties, when research people began to give serious thought to this field.

Industrial radiography's growth was slow but sure. However, its use was confined more or less to its function as an inspection device, and its helpfulness in this capacity soon was recognized by technical people in the armed services. Thus, in recent years all castings and weldments of parts in which operational failure might result in serious consequences have been radiographed for the Army. Similarly, all important and highly stressed hull castings and machinery castings which are subjected to superheated steam are radiographed for the Navy.

So important did the Navy deem radiography that it set up a policy in 1939 of lending radium and other equipment to firms supplying vital cast parts. But it went even beyond that. It felt that the future of radiography lay in its application as an aid to better foundry technique, a constructive means of locating difficulties in pilot castings, and a method for taking these difficulties into account in improved casting design for production runs. To enable foundries to carry on this work without undue expense it made excess radium available to contractors for this purpose.

In foundries, destructive tests have been employed for years as the only means of inspecting and checking on finished castings. Patterns and cores have been designed



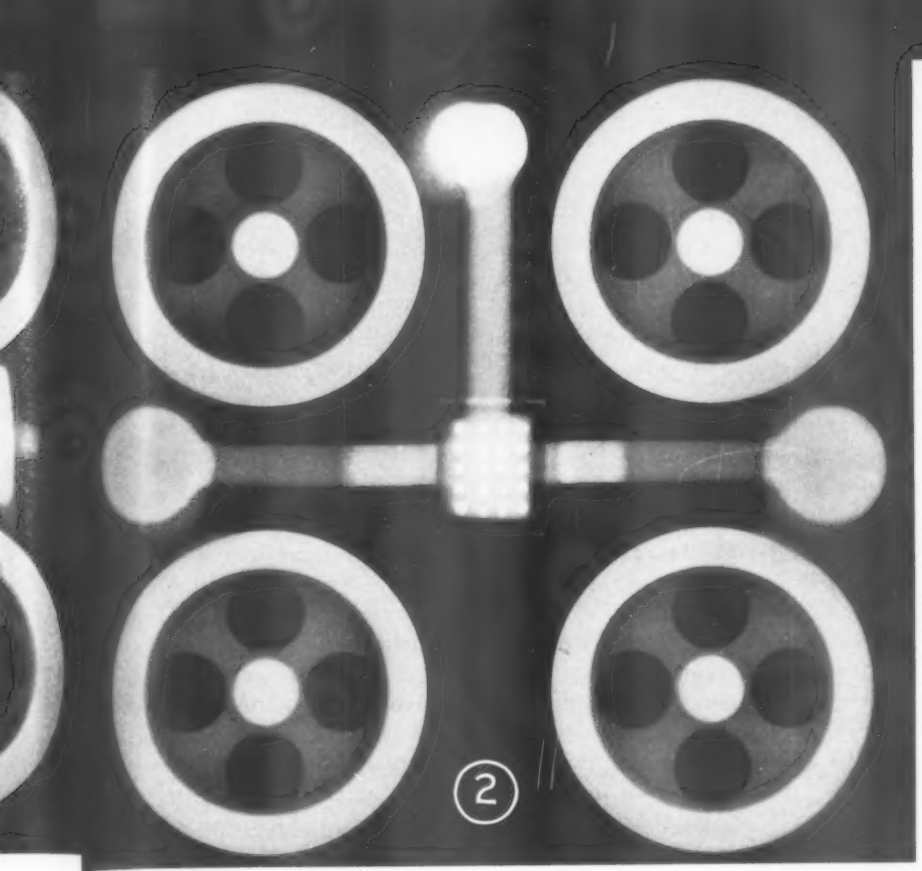


Fig. 1—Shrink (indicated by arrows) in tooth flanges of gear castings as disclosed by x-ray. Sound castings resulted (Fig. 2) when small runners were combined into single runner of greater flow capacity, and height and shape of risers were changed

tter Casting Design

according to good foundry practice, sample castings poured, and those sawed in pieces at points where voids or shrinks were suspected. If no shrinks or voids were detected the piece was accepted as sound although the saw blade might miss the void by even a thousandth of an inch, or the saw teeth might burr over the porous metal in the shrink. Thus destructive tests were not conclusive. That is one reason x-ray was made mandatory.

But with their huge backlog of orders as a result of the war, most foundries were too busy to do anything but make castings, x-ray the critical ones, reject those with flaws, and deliver the good ones. There just wasn't time to do extensive research work, no time to try to improve pattern, core, riser, runner, and gate design to bring up the rate of acceptance in their inspection departments.

As they went along, however, the radiographers, the men who make the x-ray pictures, could see that in many cases the flaws repeated themselves—appeared in the same places in a group of castings for the same part. They pondered this and when they thought they had the answer, they asked management to listen—and management did.

Far-sighted management, of course, always is interested in producing a better product at lower cost. It began to look as though the x-ray equipment might be a very useful *development* tool. If shrinks appeared consistently in sample castings of a new part, the place where the shrink occurred must be a *hot spot*, the last part of the casting to freeze, and its riser couldn't be feeding it properly during the cooling process. This indicated a need for a redesigned pattern, and more radiographs.

Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., like many other foundries, has given this matter real thought. It believes that its million-volt x-ray machine is going to prove a very useful postwar aid and ultimately may make it possible to guarantee delivery of completely sound castings. (For detailed description of this installation see THE FOUNDRY, October, 1943—Ed.). Naturally, such quality will go a long way toward lowering costs of needed consumer goods, while at the same time accelerating their production since defective castings are at a minimum.

Let's look at some examples of castings made by Campbell, Wyant & Cannon which have been improved because x-ray studies were made during their development.

Fig. 1 is an early effort at a type of gear casting. Shrink appears in the tooth flanges of each gear (as indicated by arrows) opposite the pen-

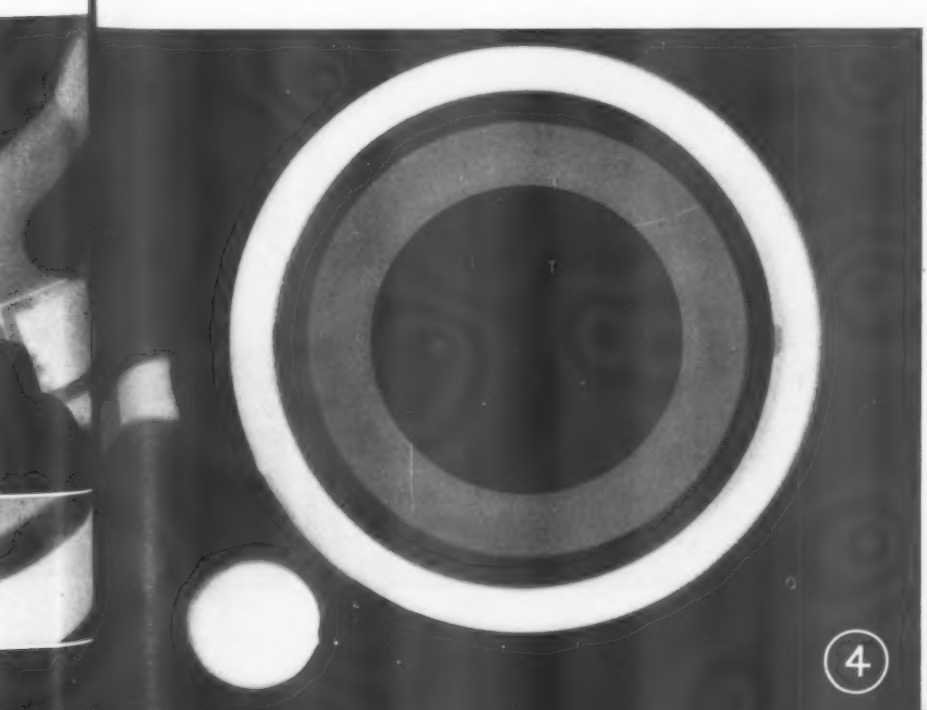


Fig. 3—This gear blank developed shrink in web when thin radial runners chilled, blocking flow of molten metal from riser. Change in gating eliminated the trouble, as shown in Fig. 4

oil gates from the risers, indicating uneven cooling gradient. When the three small runners between riser and casting were combined into a single runner of greater flow capacity, and the barrel-like risers were made higher and changed to cylindrical shapes, the trouble disappeared, as shown in Fig. 2.

A second and different example is provided by a bearing cap job. The first pattern called for eight caps, four in a cluster, in a small flask (Fig. 5). Shrinkage appeared consistently between the two middle castings on each side of the mold and in the thinnest part of the piece, where it would not be expected normally. Of course, thin parts are expected to freeze first—not last—but this mold must have had a created hot spot at the center, so that the rest of the castings tended to draw on it as a reservoir. To rectify this the size of the flask was increased, as shown in Figs. 6 and 6A, and the caps separated to distribute the heat more evenly; and thus no more trouble. Figs. 7 and 7A show the gate, riser, and runner breakout finally adopted in this interesting case history.

Gear Blank Shrinks in Web

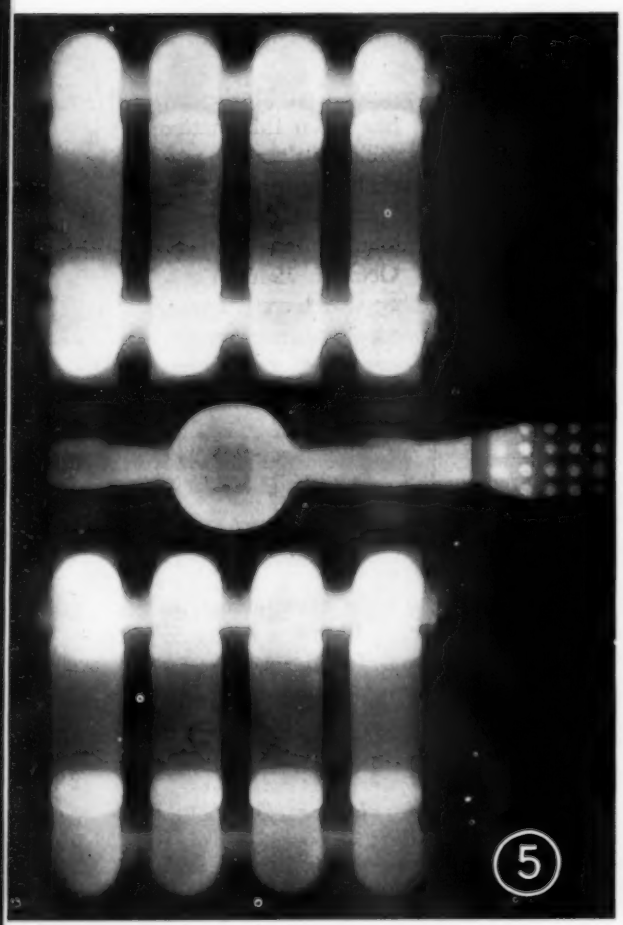
Fig. 3 is a radiograph of another type of gear blank, for which the company had orders running into six figures. Shrink is shown in the web at the points indicated. Some of the thin radial runners chilled off, blocking the flow of molten metal from the riser to the casting, preventing the necessary feeding operation during cooling. A complete pattern redesign was indicated, and the sample which resulted (Fig. 4) proved sound in the x-ray picture.

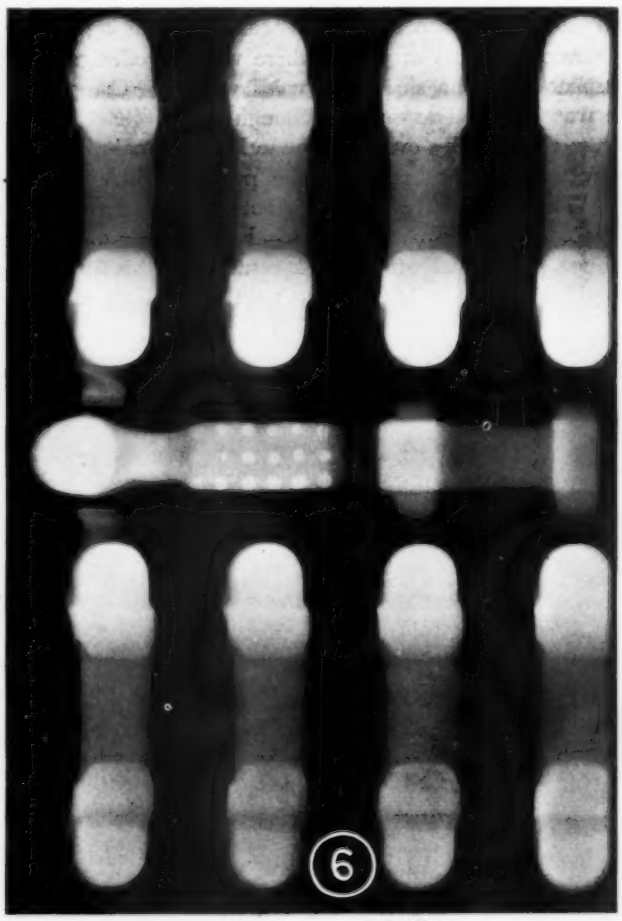
Campbell, Wyant & Cannon's million-volt x-ray machine was installed late in 1942, after well over 50,000 of this gear blank had been delivered. Of this quantity 14 per cent were returned as scrap, a not unusual percentage as castings go. But when the changes suggested by the x-ray pictures were put into practice, the scrap percentages on the next 75,000 pieces fell to a low of 1.2 per cent.

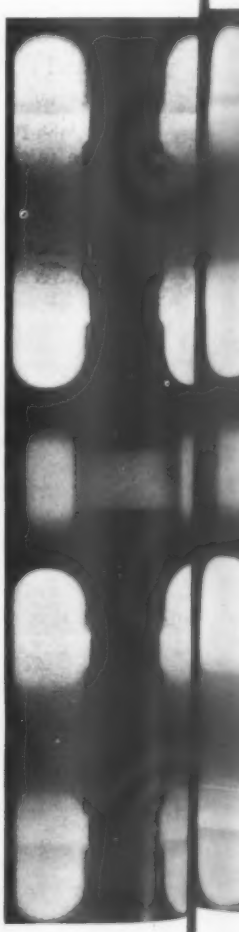
Fig. 8 shows another gear casting, with a runner around approximately half the periphery. Non-radiographed blanks of this part were delivered coincident with the gear blanks discussed previously. Again shrink shows in the web. The complete peripheral runner was tried out simultaneously on both gears, with the same result—more shrink. In Fig. 9, a slightly different type of radial runner was introduced. Now some of the shrink appeared even in the tooth flange. The problem was finally solved by adopting the same type of riser and runner combination shown in Fig. 4.

Over 50,000 of these castings were also delivered before the x-ray unit was put into operation, with a scrap

Fig. 5—X-ray picture of bearing caps cast in clusters in small flask, with shrink appearing between two middle castings on each side of mold. Figs. 6 and 6A—Shrink shown in Fig. 5 eliminated when flask size and spacing between caps were increased and larger flask used. Figs. 7 and 7A—Another view of the revised layout showing gate, riser and runner breakout







return of 21 per cent. More than 130,000 pieces have been delivered since and the scrap percentage has dropped to the very low figure of 0.6 per cent!

It doesn't take much imagination to appreciate that only a few cases of this order are required for an x-ray installation to pay its way. It is estimated that on the last two jobs alone, the foundry saved over $13,000 and added to its prestige by delivering castings to its customers in which the latter could have the utmost confidence.

The usefulness of radiography is by no means confined to ferrous casting technique. The story told by x-ray pictures can be applied equally well to pilot aluminum alloy castings made both in permanent and sand molds. Likewise the procedure can be used with brass and bronze castings.

For example, one large alloy founder in Cleveland was experiencing undue porosity in a permanent mold casting of a bomber part which took the form of a crucible weighing about 3 pounds. From the x-ray pictures it was concluded that the metal was freezing too rapidly, thus trapping the gas. A higher permanent mold temperature was indicated. This took the form of bringing the mold temperature up to 500 degrees Fahr. and the first resulting casting showed a decrease in porosity of approximately 75 per cent. Because the function of the part was known not to be critical, the relatively small percentage of porosity remaining was deemed not to jeopardize its performance, and quantity production was begun. Of course, still higher permanent mold temperatures would have reduced further the quantity of trapped gas, but the increased cooling time would not have warranted the additional cost involved in applying that procedure to eliminate the trouble entirely.

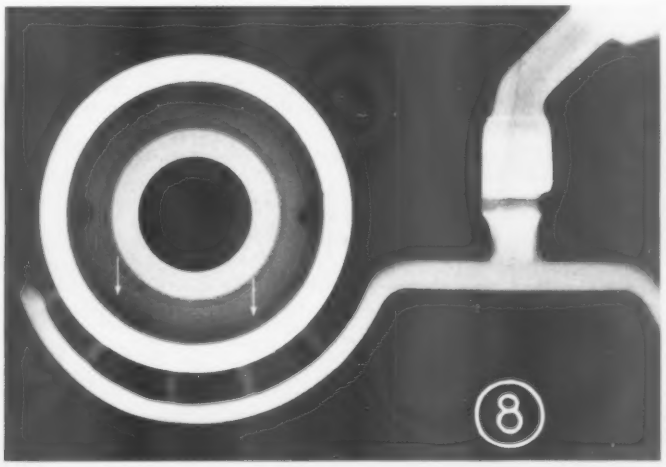
In another case at the same foundry shrinks were located radiographically in a 1-pound sand alloy casting for a fan motor housing. These appeared just inside the gate, which was chilling off as shown by the x-ray pictures. The gate size was increased substantially, and the shrinks disappeared.

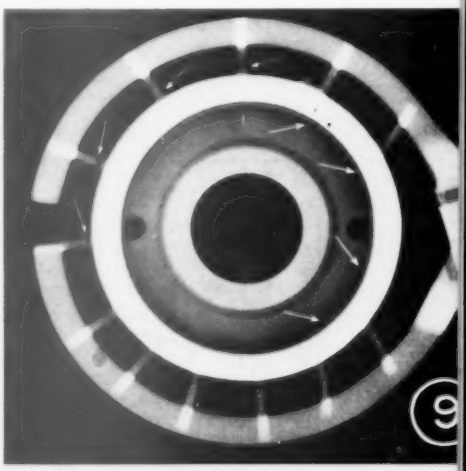
Numerous Similar Case Histories

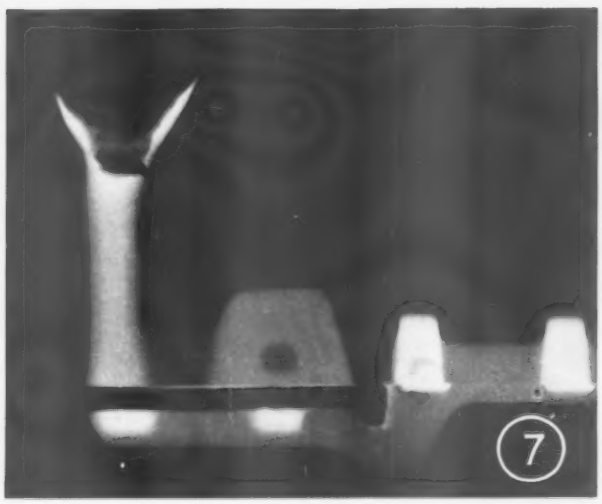
There are undoubtedly dozens if not hundreds of other similar stories. The Ford Motor Co., for example, intends to use its current 14 installations to ten times the extent it employed x-ray before the war.

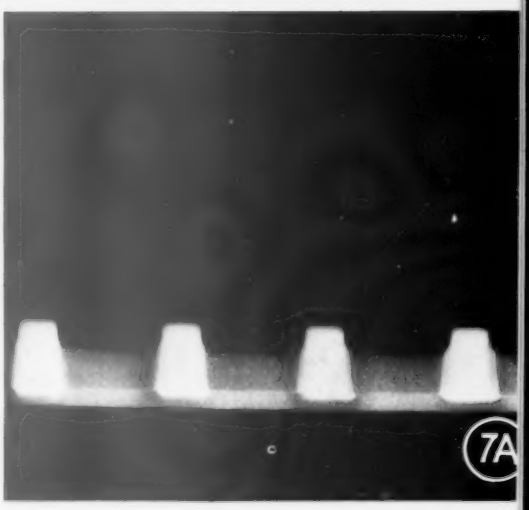
All this points up to one thing. Radiography is no longer tapping timidly at industry's door. It can now knock firmly, with the assurance that goes with achievement. Although it is still adding converts to its list of believers, its reputation as a positive working adjunct to better production is well established.

Fig. 8—Another gear casting showing shrink in the web. Use of complete peripheral runner (Fig. 9) gave same result. Problem finally solved by adopting type of riser and runner combination shown in Fig. 4









BENCH COREMAKING *Time Standards* FOR JOB SHOPS

By WILLIAM A. GREDE
Time Study Engineer
Ampco Metal Inc.
Milwaukee

TIME study engineers in jobbing shops are constantly faced with the problem of setting standard time on short running jobs. The cost of a physical time study on small orders is prohibitive, and yet an incentive for production should be installed. The solution to this problem lies in the use of standards.

At Ampco Metal Inc., Milwaukee, setting standard time for bench coremaking is difficult to do because of the wide variation in core types, sand mixtures, and wartime labor. These difficulties are encountered in most jobbing shops.

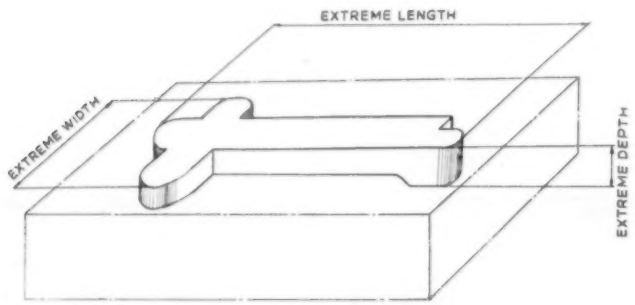
The standards used at our plant for bench coremaking, are set up using time without fatigue allowances. Fatigue allowances are computed when the standard time is translated into money. In order that all rate setters will use the same methods, and to prevent *padding* standard time by overclassifying, a set of definitions has been compiled before starting on the synthetic standards. This group of definitions has been incorporated as an integral part of the standards. The definitions are as clear and as concise as possible to prevent any misunderstanding. In the set of definitions, *greentopping*, for instance, is defined as:

"The operation of setting the pasted, dry half of the core onto the green half. Time is for setting dry half only. Time for pasting or rolling over accounted for in separate allowances."

This definition makes the meaning of the word clear and illustrates what the time study engineer had in mind when setting the standards.

After a set of definitions and instructions was compiled the actual time standards were derived from actual studies. After experimentation, it was found that the most equitable basis, according to graphs, for setting a standard time for core work was a volume factor. A base using the weight of the core as a determining factor was found to be unsatisfactory because of the excessive labor required in weighing cores. Other bases did not show an equitable distribution of time for the different cores.

The volume factor is computed as follows: Volume factor = greatest length × greatest width × greatest depth. Measurements are taken from the core, as indicated in Fig. 1. The elements (*Please turn to page* 208)



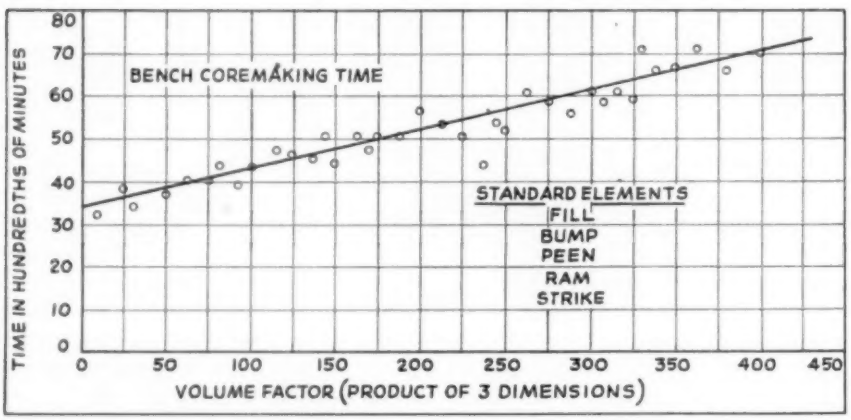


Fig. 1 (left above)—Volume factor is based on greatest dimensions of core. Fig. 2 (left)—Graph for standard elements of fill, bump, peen, ram and strike. Fig. 3 (below)—Chart showing time allowances for various operations

Core Chart

Volume Factor	0	10	25	50	75	100	150	200	250	300	350
	10	25	50	75	100	150	200	250	300	350	400
Operation											
Standard Elements (as per list)	.35	.37	.39	.41	.43	.47	.51	.56	.60	.64	.68
Rap and Draw — Easy	.05	.08	.11	.13	.15	.16	.17	.18	.19	.20	.21
Rap and Draw — Medium	.09	.12	.15	.17	.19	.20	.21	.22	.23	.24	.25
Rap and Draw — Hard	.15	.18	.21	.23	.25	.26	.27	.28	.29	.30	.31
Area Factor	0	10	20	30	40	50	60	70	80	90	...
	10	20	30	40	50	60	70	80	90	100	...
Element											
Extra Stick Peen (per level)	.06	.07	.08	.10	.12	.13	.14	.15	.17	.18	...
Extra Finger Peen (per level)	.04	.05	.06	.08	.10	.11	.12	.13	.15	.16	...
Roll to Board	.05	.05	.07	.10	.13	.15	.22	.24	.26	.29	...

GRAY IRON FOUNDERS

Plan for Postwar Period

TWO days of timely and practical discussion of important problems in the gray iron foundry industry occupied the 250 members who attended the sixteenth annual meeting of the Gray Iron Founders' Society at the Hotel Netherland Plaza, Cincinnati, Oct. 10-11.

While subjects relating to the reconversion and postwar periods received the major share of attention in the various papers, problems incident to current war production also came in for their share of discussion. Among the resolutions adopted by the society, one urged the Office of Price Administration to clarify the price regulation applying to gray iron castings and to simplify the procedure for obtaining relief under the regulation. Another resolution deplored the breach of confidence on the part of certain government agencies in disclosing confidential information submitted by the industry. (Complete text of the resolutions will be found at the conclusion of this article.)

H. L. EDINGER
V.ce President

Election of officers for 1944-45 resulted in a continuation of most of the officials who served during the past year. Walter L. Seelbach, secretary - treasurer, Forest City Foundries Co., Cleveland, was re-elected president; H. L. Edinger, president, Barnett Foundry & Machine Co., Irvington, N. J., was re - elected vice president; F. H. Rayfield, vice president, Potter & Rayfield Inc., Atlanta, Ga., was re-elected secretary, and Homer Britton, vice president, Cleveland Foundry Co., Cleveland, was elected treasurer. W. W. Rose continues as executive vice president.

Mr. Britton and the following were elected directors to serve 3 years: George H. Alten, Alten's Foundry & Machine Works, Lancaster, O.; Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.; S. D. Russel, Phoenix Iron Works, Oakland, Calif.; H. A. Stockwell, Barbour-Stockwell Co., Cambridge, Mass., and F. L. Williams, Cooper-Bessemer Corp., Grove City, Pa.

At the opening session President Seelbach reviewed the last year's activities of the organization and the contributions of the industry to the war effort. In discussing wage adjustments for workers he urged foundrymen in their individual regions to act co-operatively in seeking increases, rather than attempt to act individually and thereby upset existing differentials.

Importance of thorough training of the personnel delegated to handle termination of war contracts was emphasized by Lieut. Col. Francis W. Parker Jr., chief, Training Division, Readjustment Branch, Army Service Forces, Washington. He stated that both Procurement Regulation 15 and its eventual successor, the joint Army and Navy Termination Regulation, represent a compendium of the experience of many government and contractor representatives in the termination of many thousands of different contracts in all parts of the country. At the same time, it is up to the contractor to train its organization in termination work. The smaller the contracts the more important does training become, because until every subcontractor has completed his share of the job, he is a bottleneck in preventing completion.

W. L. SEELBACH
President

Colonel Parker urged each contractor first to set up his organization of one or more men responsible for the termination procedure; next to obtain and study all the current literature on termination. To aid the contractor whose problems are particularly involved, a series of schools has been established at various universities for more intensive training. The next step should include a review of the contracts and a study of stock control, auditing and inventory methods to determine if they fit into the picture. Additional information that is required may be obtained from customers or from the government office which let the contract. Local procurement offices also are available to contractors for assistance.

Effective use of industry statistics will be of considerable value to foundries in the postwar period, it was stated by Owen C. Gretton, United States Bureau of the Census, Washington. In addition to those figures available before the war on production of various consumer goods in which the foundry industry is particularly interested, surveys are planned by the bureau on many end-products not previously covered. Mr. Gretton explained that by watching the unfilled orders-shipments ratio of those products in which (*Please turn to page* 201)

By WILLIAM G. GUDE
Associate Editor
THE FOUNDRY

Heat Treatment of Moderately Heavy Cast Steel Sections

By K. L. CLARK, H. F. BISHOP and H. F. TAYLOR
Naval Research Laboratory, Washington

BEFORE World War I heat treating was mostly tool treating, and anything beyond stress relieving or hardening for resistance to wear was given relatively little consideration. This situation started to change in the early '20s with the rapid expansion of the automobile manufacturing industry and accompanying emphasis on prevention of field failures. Today, many highly stressed machined parts having permissible size are heat treated to optimum strength and ductility by quenching and tempering.

Unfortunately, the natural laws of heat transfer limit the section size which can be fully hardened in any but highly alloyed steels, and even these have distinct limitations in that regard. Moreover, high cost and inferior machining and welding characteristics of highly alloyed steels make them impracticable for most applications. As a result, heavy castings are usually made of compositions approximating Navy Class "B" steel (carbon—0.30 per cent maximum; manganese—0.60 per cent maximum; silicon—0.60 per cent maximum), and are heat treated by normalizing and tempering or by full annealing.

In regard to the heat treatment of large castings, there have been widely divergent opinions. Some metallurgists feel that high temperature soaking treatments are necessary for the development of the best physical properties in subsequent treatments; others think that such treatments are merely wasted time and money. Heating rates, cooling rates, time at temperature and other variables are frequently debatable as to their effect upon the properties obtained in the metal.

Thus, an investigation was made to clarify some of these issues. Also, prior to the work described in the following paragraphs, Navy specifications required full annealing of anchors and certain other heavy steel castings. In view of the demand for heat treating facilities due to expanded production of Navy material, it was considered desirable to attempt to lessen the long "in-the-furnace" time required by such a treatment.

Accordingly, 12 test castings were made to simulate the section of a heavy anchor shank, each being 10 inches square and 20 inches high. A photograph of the castings is reproduced in Fig. 1. Test coupons of the type shown in Fig. 2 also were cast. The castings and corresponding coupons were poured from three very similar basic electric steel heats, the compositions of which are listed in Table I.

A test casting and a coupon from each heat were given full annealing treatments according to Navy specifications to establish properties for bases of comparison. Each of the other nine castings was heat treated individually with a coupon from the same heat according to the schedule given in Table II.

After heat treatment, each test casting was sectioned by taking a transverse segment, 4½ inches thick, at a position midway between the two ends. Tensile specimen blanks for standard 0.505-inch diameter shoulder grip specimen and blanks for izod impact specimens were removed from the corners and the center so that the longitudinal axes of the specimen blanks were parallel to the longitudinal axes of the castings. Another transverse segment, ¾-inch

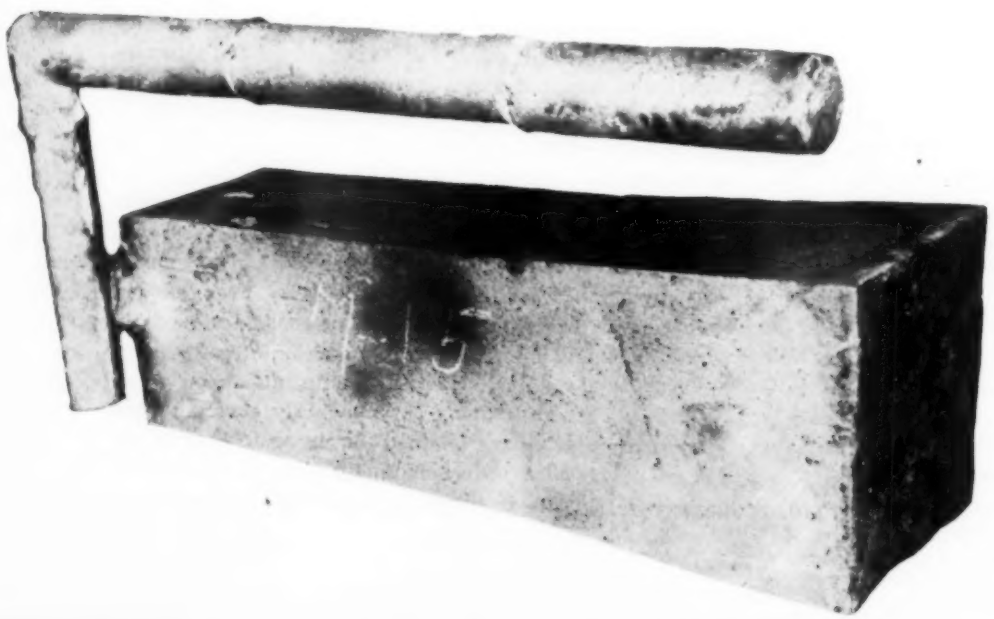


Fig. 1—One of 12 test castings made to simulate section of heavy anchor shank. Casting is 10 inches square, 20 inches high

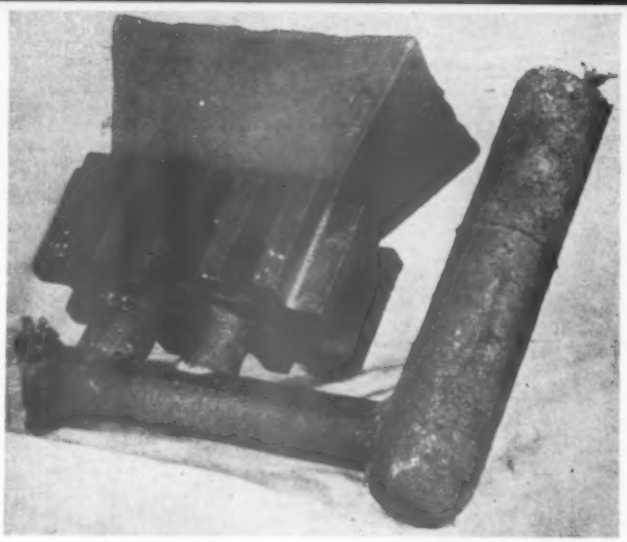
thick, was removed closely adjacent to the first one to furnish material for cold-bend specimens which were machined to have finished dimensions of 1 x ½ x 6 inches with slightly rounded corners.

Tensile test specimens and izod impact specimens were taken from the projecting fingers of the coupons and cold-bend specimens were taken from the bodies of the coupons.

All specimens were tested according to standard procedures. The results appear in Table III. Tensile test results are also shown in the form of a barograph, Fig. 3. Photomicrographs from some of the castings are reproduced in Fig. 4.

Before an attempt is made to analyze the results obtained from the different treatments, it is advisable to state the reasons for adopting such treatments. No. 1 was designed to show the effect of a short soak at 1800 degrees Fahr. prior to a short normalizing and tempering treatment. A single short normalizing and tempering treatment is represented by No. 2 whereas No. 5 was devised to reduce heat treating time to the absolute minimum which might be employed in a single normalizing and tempering treatment. Nos. 7 through 11 were based upon normalizing from 1650 degrees Fahr. after holding at temperature for one hour per inch of section and tempering at 1250 degrees for one hour per inch of section; variations of this base treatment consisted of prior normalizing at 1650, 1800, and 2000 degrees Fahr., and single normalizing at 1650 degrees and tempering at 1250 degrees with holding times of ¼-hour per inch of section. Treatments Nos. 3, 6 and 12 were identical, being the single anneal required by the Navy specifications; these treatments serve as bases for comparison.

Treatment No. 4 was the only one in which liquid quenching was employed. As previously mentioned, it is impossible to fully harden a section 10 inches square made of Navy Class "B" steel, and it was not expected that the structure and properties would be the same as those produced in a section having the proper size and composition to "quench out" completely; however, it is to be noted that the overall properties produced by this treatment are considerably



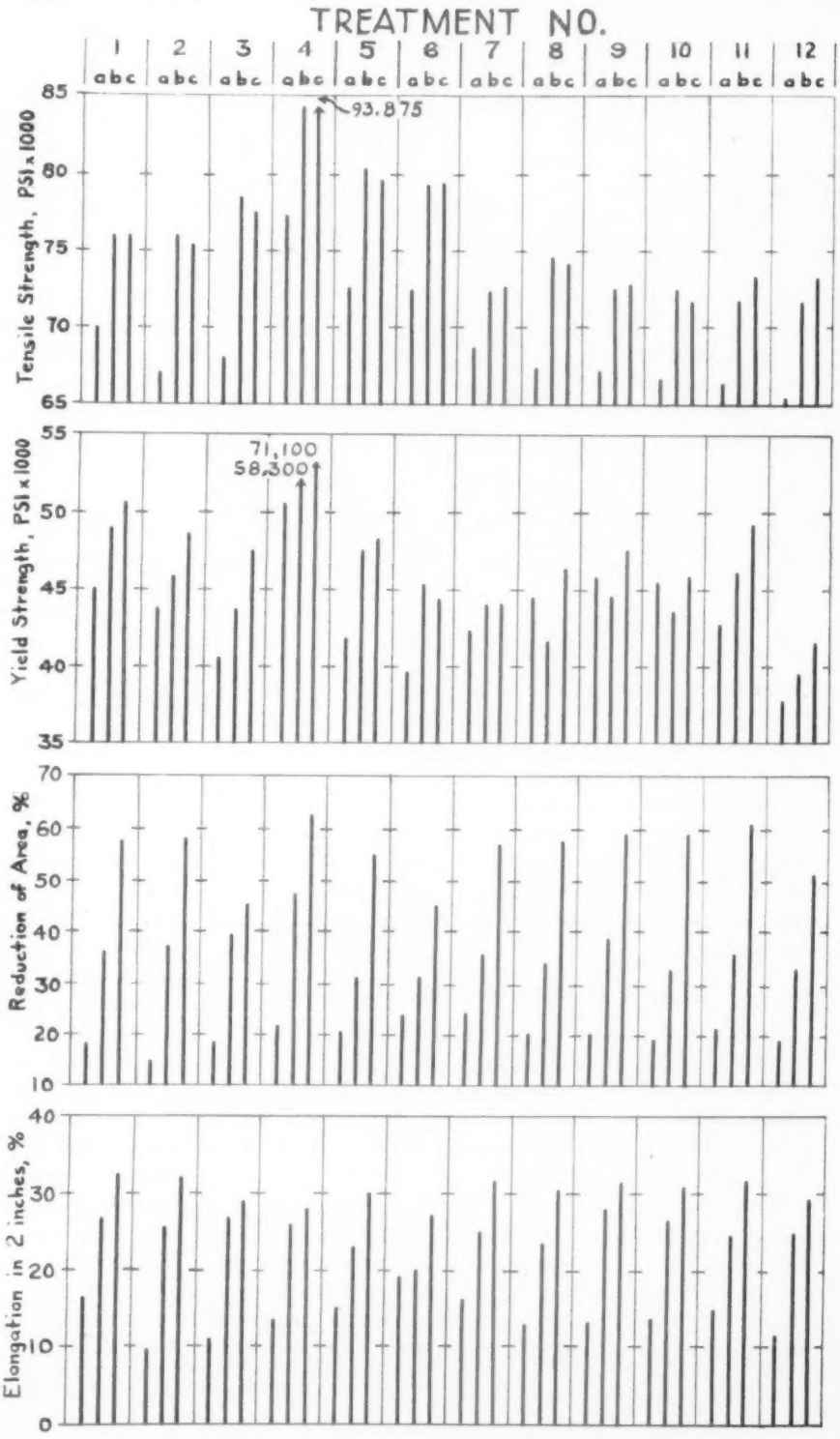
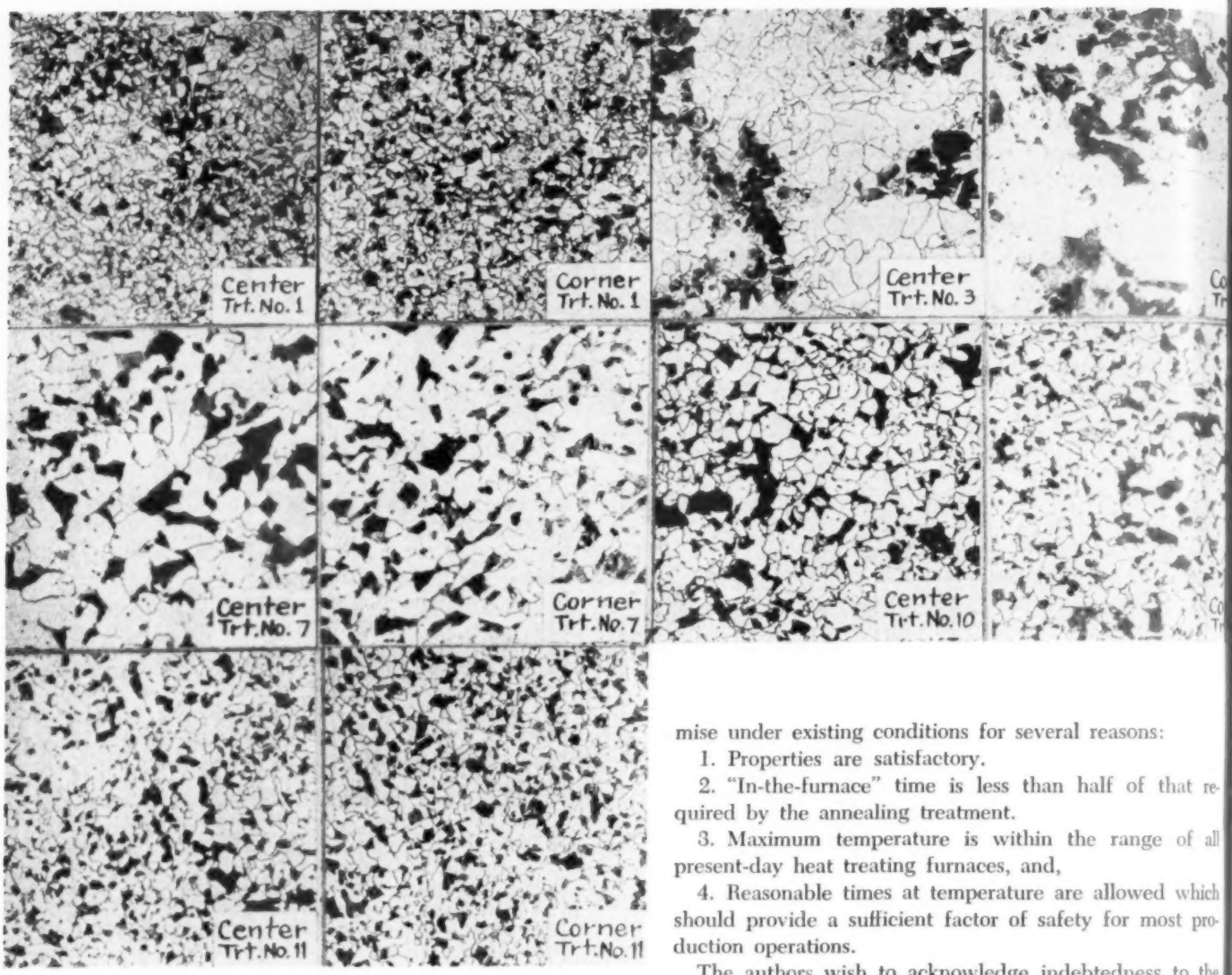


Fig. 2 (top right)—Test coupons poured of various compositions shown in Table I.

Fig. 3 (right)—Barograph of tensile test results. Details of 12 heat treatments are listed in Table II. Position of test: a—center; b—corner; c—coupon



better than those developed by the other treatments. Hence, it is believed that quenching and tempering treatments do have advantageous possibilities for heavy castings of suitable design.

Practically all of the normalizing treatments are equal or superior to the corresponding annealing treatments. Even Treatments Nos. 5 and 8 in which "in-the-furnace" time is reduced to a minimum give properties very nearly equivalent to those produced by Treatments Nos. 6 and 12, respectively.

Single Normalizing Best Compromise

Homogenizing prior to normalizing does not seem to improve physical properties materially although the trend of cold-bend ductility is upward with progressively increased temperature of homogenizing, as can be noted by comparing the results of Treatment No. 7 with those of Treatments Nos. 9, 10 and 11.

Notwithstanding the improvements in properties produced by quenching and tempering or double normalizing and tempering treatments, or the great saving of "in-the-furnace" time effected by the very brief single treatments, it is believed that the single normalizing and tempering treatment as typified by No. 7 is the best compromise under existing conditions for several reasons:

1. Properties are satisfactory.
2. "In-the-furnace" time is less than half of that required by the annealing treatment.
3. Maximum temperature is within the range of all present-day heat treating furnaces, and,
4. Reasonable times at temperature are allowed which should provide a sufficient factor of safety for most production operations.

The authors wish to acknowledge indebtedness to the Navy Department for sponsoring the work.

A.S.T.M. Advances Publication Date of Standards Book

HEAVY demands for the 1942 *Book of A.S.T.M. Standards* and its *Supplements* have necessitated advancing publication of the next book to December, 1944. Many new specifications and tests for engineering materials and important changes in existing standards have been approved by the society. Committee A-1 on steel has developed methods of magnetic particle testing and inspection of commercial steel castings and heavy forgings. Eventually the committee hopes to issue a monograph on this method.

Committee A-3 on cast iron is completing new specifications for materials for pressure-containing parts to be used up to 650 degrees Fahr., and also tentative specifications for lightweight and thin-section gray iron castings were approved to replace existing standard A190. During the war period emergency specifications were issued covering the use of malleable iron castings for flanges, pipe fittings and valve parts, and since they proved serviceable, they now are being issued as regular A.S.T.M. specifications.

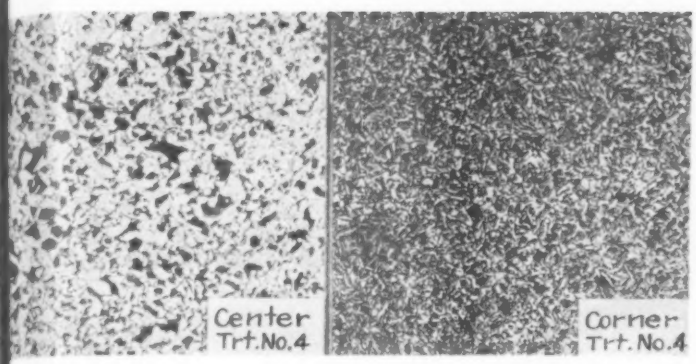


Fig. 4 (left)—Photomicrographs at 100 diameters showing microstructures at centers and corners of 10-x10-x20-inch castings given selected treatment

TABLE I—Composition of Steel Used

Elements	Heat R	Heat S	Heat T
Carbon	0.24%	0.27%	0.24%
Manganese	0.66	0.63	0.56
Silicon	0.44	0.43	0.40
Sulphur	0.016	0.012	0.017
Phosphorus	0.031	0.030	0.036
Copper	0.21	0.17	0.15
Nickel	0.75	0.73	0.79
Chromium	0.22	0.19	0.15

TABLE II—Heat Treatments Employed

Steel Composition	Treatment No.	Heating Temp. °F	Holding Time Hrs.	Method of Cooling	Reheating Temp. °F	Holding Time, Hrs.	Method of Cooling	Tempering Temp. °F	Holding Time, Hrs.	Method of Cooling	Approx. Total Time, Hrs.
R	1	1800	6	AC to 950 F.	1650	3	AC to 900 F.	1300	3	FC to 720 F., AC	32
R8	2	1700	4½	AC to 900 F.				1300	3	FC to 950 F., AC	36
R	3*	1600	25	FC to 865 F., AC							64
S	4	1800	5	AC to 750 F.	1650	2	WQ	1230	4	AC	22
S	5	1800	2	AC to 750 F.				1230	4	AC	13
S	6*	Same as No. 3									
T	7	1650	10	AC to 800 F.				1250	10	AC	28
T	8	1650	2½	AC to 800 F.				1250	2½	AC	13
T	9	1800	10	AC to 800 F.	1650	10	AC to 800 F.	1250	10	AC	43
T	10	2000	10	AC to 800 F.	1650	10	AC to 800 F.	1250	10	AC	44
T	11	1650	10	AC to 800 F.	1650	10	AC to 800 F.	1250	10	AC	42
T	12*	Same as No. 3									

NOTE: AC—Air Cooled; FC—Furnace Cooled; WQ—Water Quenched.
*Treatments 3, 6 and 12 were used as control treatments in which the heating time was 15 hours and cooling time was 24 hours; in all other treatments, the heating rate was approximately, 400°F per hour.

TABLE III—Effects of Heat Treatments Upon Physical Properties in 10 x 10 x 20-inch Castings and Coupons

Heat	Heat Treatment No.	Location of Sample	Tensile Strength Psi	Yield Strength Psi	% Redn. of area	% Elong. in 2 in.	Izod Impact Ft.-lb.	Cold Bend Max. Load Lb.	Cold Bend Angle of Bend, Deg.
R	1	Center	70,000	45,000	18.1	16.4	31.5	7,400	95
	1	Corner	76,000	49,000	35.8	26.8	30.0	7,600	95
	1	Coupon	76,000	50,500	57.4	32.4	35.0	7,900	135*
	2	Center	67,000	43,750	14.5	9.4	22.0	7,100	65
	2	Corner	76,000	45,900	37.0	25.8	20.5	7,600	75
	2	Coupon	75,500	48,850	58.2	32.0	27.0	8,000	135*
	3	Center	68,000	40,500	18.1	10.9	32.0	7,400	75
	3	Corner	78,650	43,800	38.5	26.5	31.0	7,600	70
	3	Coupon	77,500	47,500	45.2	28.9	37.5	8,000	135*
S	4	Center	77,250	50,650	21.0	13.0	51.0	7,750	71
	4	Corner	84,500	58,300	47.0	26.0	64.0	8,300	84
	4	Coupon	93,875	71,100	63.0	28.0	79.0	8,600	135*
	5	Center	72,500	41,900	20.0	15.0	40.0	7,350	63
	5	Corner	80,250	47,600	31.0	23.0	32.0	7,550	66
	5	Coupon	79,750	48,250	55.0	30.0	33.0	8,000	135*
	6	Center	72,500	39,650	24.0	19.0	37.0	7,400	68
	6	Corner	79,350	45,200	31.0	20.0	27.0	7,800	70
	6	Coupon	79,375	44,500	44.0	27.0	30.0	8,100	135*
T	7	Center	68,875	42,200	24.7	16.0	28.0	6,660	84
	7	Corner	72,415	44,000	36.7	25.1	31.0	7,030	77
	7	Coupon	72,690	44,000	57.5	31.7	34.8	7,505	135*
	8	Center	67,460	44,500	20.7	12.8	34.8	7,080	85
	8	Corner	74,585	41,625	34.3	23.9	36.0	7,305	115
	8	Coupon	74,050	46,250	57.6	30.5	41.5	7,455	135*
	9	Center	67,170	45,960	23.2	13.1	37.1	7,120	83
	9	Corner	72,585	44,625	39.2	28.0	32.3	7,245	97
	9	Coupon	72,810	47,750	59.9	31.5	42.0	7,525	135*
	10	Center	66,750	45,500	19.9	13.6	34.8	6,950	94
	10	Corner	72,420	43,670	33.1	26.5	33.3	7,185	121
	10	Coupon	71,875	45,940	59.4	31.0	39.3	7,240	135*
	11	Center	66,375	42,875	21.5	14.8	40.9	7,085	94
	11	Corner	71,875	46,040	36.3	24.6	35.0	7,235	135*
	11	Coupon	73,190	49,190	60.7	31.8	42.0	7,470	135*
	12	Center	65,165	37,915	19.8	11.4	38.0	6,975	75
	12	Corner	71,665	39,625	32.7	24.8	35.3	7,740	107
	12	Coupon	73,060	41,625	50.5	29.2	38.3	7,530	135*

(*) Upper limit used.

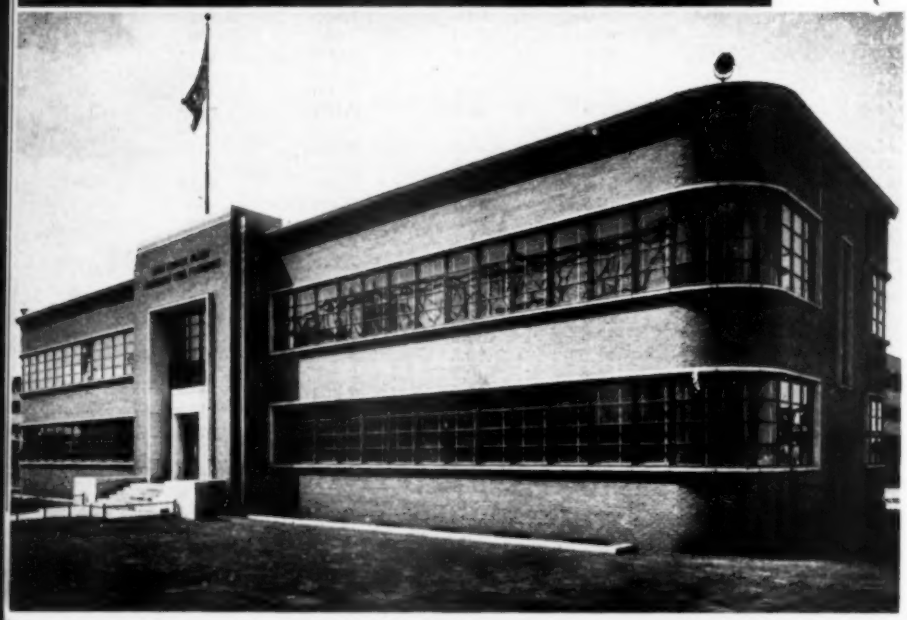
Modern Foundry

ONE of the most interesting architectural achievements of the entire war plant program—realized despite materials priorities and the urgency for speed—is the Cast Armor Plant operated for the government by the American Steel Foundries at East Chicago, Ind. So radically does this project break from conventional foundry design that industrial architects feel it may well denote a new trend in foundry construction.

The overall scheme is the result of a studied effort to get away from the drab and haphazard type of conventional foundry architectural design in the past. Here is a structural layout pleasing in external appearance and offering, in interior light and cleanliness, much better working conditions than those frequently prevailing in older foundries. Interior layout and equipment were planned for utmost employe convenience.

Broad sweeping horizontal lines characterize the motif of the main production and all subsidiary buildings, tying them into a unified pattern and giving the layout the illusion of less height than is actually the case.

Special study was given to lighting to avoid a dim and depressing interior. These studies were pointed to a three-fold objective: First, to get all possible natural daylight into the structure; second, to achieve a sash arrangement in pleasing architectural lines; and third, to provide for pos-



Left, above—Foundry of Cast Armor Plant, American Steel Foundries, viewed from northeast. Left, center—Interior view of foundry shows provisions for entry of large amount of natural light. Left, below—Office building exterior also incorporates sweeping horizontal lines. Right, above—Maintenance and machine shop. Right, below—Personnel building

Architecture

By MARY MUNRO SMITH
Albert Kahn Associated
Architects & Engineers Inc.
Detroit

sible blackout if that should be required.

The first and second objectives were achieved in the main production building, as is evident in the accompanying photographs, by a monitor type roof and walls consisting of three horizontal bands of continuous sash separated by strips of corrugated asbestos siding each 7 feet 2 inches wide.

Provision for blackout was made by running a railing, also visible in the photographs, completely around the building above the top sash bands from which blackout materials could be suspended. This railing also serves a secondary function as a support for the bosun's chair in window cleaning.

The broad sweeping bands of horizontal sash dominant on the central building design extend likewise to the personnel building, office structure and other subsidiary buildings. Even the boiler house reveals a similar technique in exterior design. Instead of four walls in a conventional arrangement, the different sections are terraced with the bunker section highest and the compressor section lowest. Each section is lighted according to its particular needs, and again the lighting arrangement stresses the horizontal theme in a modified form.

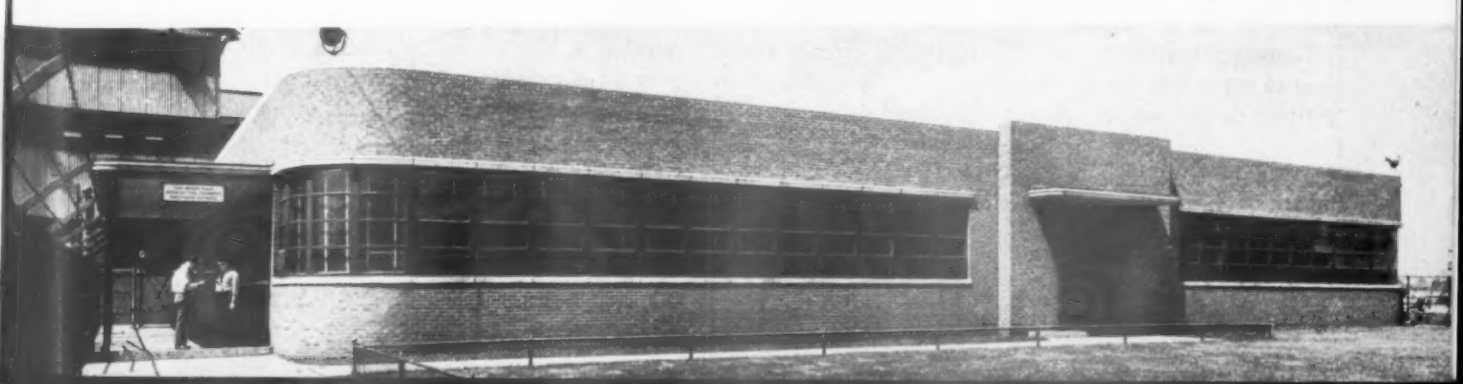
Of steel, concrete and brick construction, the main building (which is, in fact, several interconnected buildings on the same plan) has a steel frame construction with common brick walls to the sills, 8 feet above grade, surmounted by alternate rows of sash and siding as already mentioned. The roof is cement tile covered with tar and gravel. The charging floor is conventional ¼-inch steel with brick top, but the main foundry floor is 8 inches of concrete. Open-hearth furnace chimneys are brick.

Included in the main building are an open-hearth building and three foundry buildings totaling 1600 x 363 feet, three cleaning and finishing buildings, each 960 x 177 feet, six heat treat buildings each 240 x 110 feet, and a maintenance building 700 x 76 feet.

There are 18 monitors across the entire width of the foundry buildings and 11 others on the roofs of the cleaning and finishing buildings.

Steel framework includes numerous heavy sections, which are made necessary by the various traveling cranes of 15 to 50-tons capacity required to handle large castings. In addition, the plant is equipped with many smaller cranes.

An unusual feature is the location of toilet, lunch and locker rooms around the sides of the main building, where employes enter and leave. There are ten such units, each of two-story construction, with glazed hollow tile walls, cement floors, and metal partitions. The main locker rooms and showers are on the second floor of each unit, and ample provision is made for all employes who wish to take a shower and change clothes before leaving the plant. Adequate toilet facilities also are located in the various departments of the (*Please turn to page* 212)



Determination of Sprue Size in Aluminum Castings

By CORNELIUS BENKOE
Monarch Aluminum Mfg. Co.
Cleveland

A FACTOR which is of great importance to the production of sound castings, and which has been stressed in the foundry technical papers, especially those dealing with light alloy castings, is that the downsprue must be kept choked while the casting is being poured.

While this simple truth is well-known to most foundrymen, the actual attainment of this condition has been more often than not a matter of experiment by trial and error. If the downsprue be made too small, an unnecessarily high pouring temperature must be used, while if the downsprue were to be made too large, it might be found that the pouring crucible could not be emptied fast enough to keep the pouring basin and downsprue full.

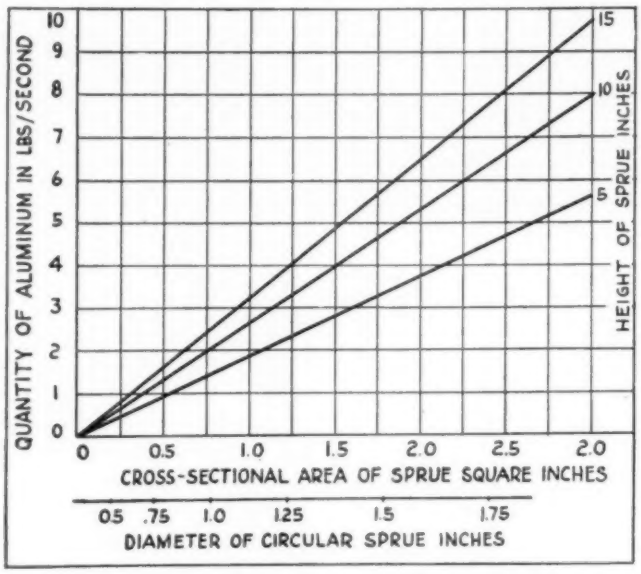


Chart showing relationship of pouring rate, height of sprue, area and diameter of sprue

The accompanying chart was developed to eliminate some of the guesswork involved in determining the correct size of downsprue. It is based on two facts:

1. All pouring devices, such as hand ladles, two-man-shank crucibles and crane-operated ladles, have a maximum rate of pour, which is the fastest rate at which they can be emptied of their contents into a given size container or basin without undue splashing. This pouring time can be measured.

2. The quantity of fluid flowing through an orifice (the downsprue) is directly proportional to the pressure, or "head" on the fluid. In this case the "head" would be the vertical distance from the top of the pouring basin to the bottom of the downsprue. This too can be measured.

Knowing these two items, the maximum cross-sectional area of sprue that can be choked successfully with a given pouring device may be calculated by the formula

$$Q = KA\sqrt{2gH}, \text{ in which}$$

Q is the quantity of liquid, in cubic feet per second, flowing through a rectangular or circular orifice of cross-sectional area A square feet, and under a head or pressure of height H feet, g is the acceleration due to gravity, taken as 32.16 feet per second per second, and K is a constant which will have to be calculated for the conditions involved.

Kent's *Engineering Handbook* gives a value for K of 0.62 when the liquid is water. The coefficient of viscosity of water at room temperature is 0.010. If we assume an average coefficient of viscosity for aluminum alloys at pouring temperatures of .020, then K for molten aluminum would be

$$K_{al} = 0.62 \times \frac{0.010}{0.020} = 0.31,$$

since the flow of liquid is inversely proportional to the viscosity. The quantity $\sqrt{2g}$ remains constant, and is equal to 8.02. Combining these constants,

$$Q = 2.49A\sqrt{H}$$

Converting the cubic feet to pounds (using specific gravity of aluminum alloys as 2.7), and the measurements to inches, the formula becomes

$$W = 2.49 \times 62.4 \times 2.7 \times \frac{A}{144} \times \sqrt{\frac{H}{12}} = 0.84A\sqrt{H}, \text{ in which}$$

W is the quantity of aluminum, in pounds per second, flowing through a downsprue of cross-sectional area A square inches and height H inches.

As an example: Given a mold with a poured weight of 50 pounds, including runners and risers. Distance from top of pouring basin to bottom of downsprue is 10 inches. Mold is to be poured with a 90-lb. crucible that can be emptied in say 15 seconds without splashing, a rate of pour of 6 pounds per second. From the 6-pound per second point on the vertical scale of the chart a line is extended to intersect the line marked "10 inch height of sprue". From this intersection a line is dropped to the horizontal scale to give a cross-sectional area of 2.25 square inches, corresponding (*Please turn to page* 184)

Chilled Iron Produced by TELLURIUM

By JOHN S. CROUT
Battelle Memorial Institute
Columbus, O.

TELLURIUM is a very potent, chill-producing, alloying element in cast iron. It may be used to increase the hardness of a chilled surface, to increase the depth of chill, or to produce uniform or local chill without the use of metal chills. The white iron chilled surface produced by tellurium is not only hard and wear-resistant, but it is more resistant to some types of chemical attack than ordinary chilled surfaces. Since the results may be obtained with very minute additions of tellurium, important cost reductions may be made over those of more complicated and less effective methods of chilling.

Hard, wear-resistant chilled surfaces are normally produced on gray iron castings in one of two ways.

The molten iron may be poured against a metal surface which extracts the heat rapidly, causing quick solidification of the surface as white iron. Or, the carbon, silicon, and sulphur contents of the molten iron may be adjusted within close tolerances, and carbide-stabilizing agents such as chromium or vanadium added to produce a white iron surface.

Both of these methods have practical operating disadvantages. Metal chills generally are expensive in their initial cost and are almost prohibitive when only a few castings are to be made. Even when used on a production run, they require constant attention to keep their surfaces free from defects, and their life is limited.

The securing of hard, wear-resistant surfaces by control over the iron composition is difficult because of the close limits required. Under excellent operating conditions, variations in the composition produce variations in depth of chill and sometimes mottling of the wear-resistant surfaces, which may then subject the piece to rejection.

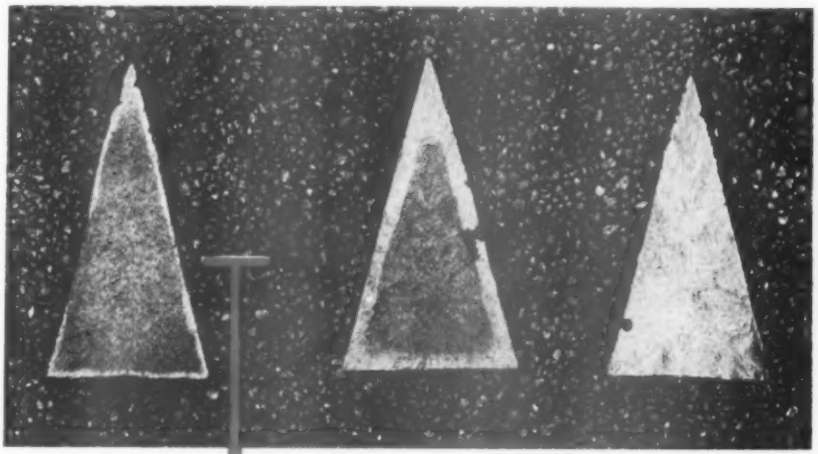
These difficulties largely are eliminated when the hard, wear-resistant surface is produced by adding tellurium to the gray iron. With this process, it is possible to cast in sand molds and secure surfaces comparable to those obtained by either of the foregoing methods. According to Lorig and Krause[1], the depth of the chill can be controlled by variations in the amount of tellurium applied.

These investigators further state that the chills produced by tellurium additions are uniform in depth and are usually distinguished from chills obtained by other methods by the fact that a mottled zone between the chilled surface and the gray iron interior is rarely found. The transition from gray iron to white iron is usually quite sharp, but, despite this, the chilled portion has marked resistance to spalling from thermal or mechanical shock. When more gradual gradations from the chilled surface to the gray iron interior are desired, Smalley[2] advises the use of graphitizers which may be added in conjunction with the tellurium to effect such gradations.

Depth of the chill obtained varies with the size of the casting, the composition of the iron, the time elapsing from the moment the tellurium is added to the moment the metal is poured, and the amount of tellurium added.

However, even with large castings, a strongly graphitizing iron and an undue lapse of time, less than 0.1 per cent of tellurium will produce an excellent chilled surface and the actual tellurium required probably will be within the range between 0.001 and 0.05 per cent.

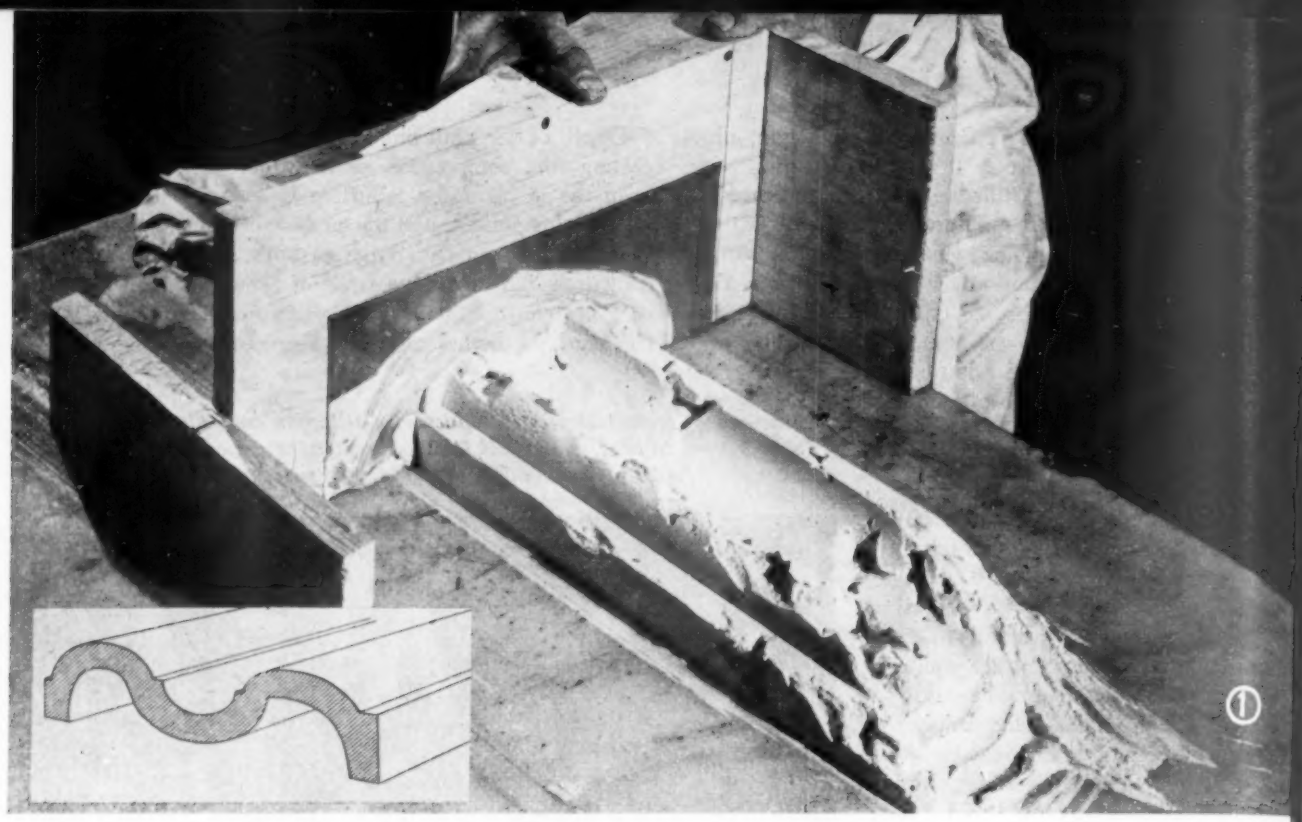
Fractures of test wedges show influence of tellurium on chilling tendency of cast iron. Wedge at left had 0.02 per cent tellurium added; in center 0.028 per cent added; at right 0.045 per cent added



The accompanying illustration indicates the influence of tellurium on the chilling tendency of cast iron and the sharp demarcation between the chill and the gray interior, as shown in fractures of test wedges. Base composition of the iron is 3.30 per cent carbon, 1.70 per cent silicon, 0.50 per cent chromium, 0.60 per cent manganese, 0.07 per cent sulphur. The first wedge had 0.02 per cent tellurium added, the second 0.028 per cent and the third 0.045 per cent.

Tellurium may be added directly to molten iron as a solid metal or as a powder. As previously stated, its potency tends to decline with time, hence it should be added just before pouring.

A second method of supplying it is to treat the mold prior to pouring. This may be done by applying the tellurium as a dry powder, by painting or spraying it on from a solution, or by applying it to a pattern from which it is transferred to the mold surface. In any case, the value of the addition will (*Please turn to page* 218)



Patterns of Gypsum

Methods of forming patterns of various shapes are detailed in this second of two articles describing the use of gypsum cement in patternmaking. The first installment appeared in October

RUN work or straight mold method is employed to produce patterns or pattern stock of gypsum cement for models with parallel edges. It is the easiest and simplest type of pattern to make with such cement. There is no restriction on the contours that can be produced by this method.

For example, consider the steps necessary to produce a pattern for the casting shown in the insert in Fig. 1, with contoured surfaces on the face and on the back. The first step is to make a suitable sled and grease the bench. Since this is a double face job, a first or prime run must be made. This run serves as a follow board, or support for the pattern. The templet is cut to follow the contour of the back of the pattern, and is attached to the sled. The cement is mixed a little below normal consistency for the first mix, then allowed to cream slightly before it is placed on the bench in front of the templet. If some of the cement is allowed to lap over the end of the bench, it will act as an anchor to prevent the pattern from sweating loose before the work with the templet is finished.

When gypsum cement sets, it heats up to some extent, depending on the type. Through condensation, water settles between the plaster and the bench. If proper precautions are *not* taken, the plaster form will free itself from the bench before the screeding is finished. Plasteline or modeling clay pressed at intervals on the bench also gives the cement a grip and helps to anchor it in place.

As the creaming action progresses the cement becomes stiffer and firmer and therefore easier to manipulate with the spatula. The cement is spread in front of the templet roughly and approximately to the desired shape. Too great a mass should not be built up in front of the templet. It is advisable to build up gradually by adding more cement after each screeding. The templet is pushed firmly through the plastic mass. Then it is picked up, the templet is cleaned and waste cement is discarded. Fresh cement is added to fill the voids and the sled and templet are pushed through again. The routine is repeated as often as necessary to produce a smooth, finished surface. The sled and templet always are pushed in the same direction. No back tracking. In general, the routine is similar to that practiced by the loam molder in the foundry. The high spots in any profile are the most difficult to build up, and require the greatest care on the part of the operator. The low spots automatically take care of themselves.

Work should be stopped on the first mix when it has progressed so far through the period of plasticity that it will no longer make a good bond. Gypsum cement should not be retempered. It will become chalky and will have no strength. During the forming period, the less the cement is handled the (*Please turn to page* 186)

Cement

By E. H. SCHLEEDE
Industrial Division
United States Gypsum Co.
Chicago

Fig. 1 — Passing template through gypsum cement to make pattern for casting shown in insert. Fig. 2—Building up details of pattern by rotation of template. Pattern is made in four parts, as shown in insert. Fig. 3—Large and extremely accurate lofted pattern. Contour is controlled by metal lofting-templates shown embedded in pattern. Fig. 4—Making follow-board for square pattern by passing template along each side of slab. Fig. 5—Showing method of forming patterns of cylindrical or kindred shapes

Postwar Outlook for

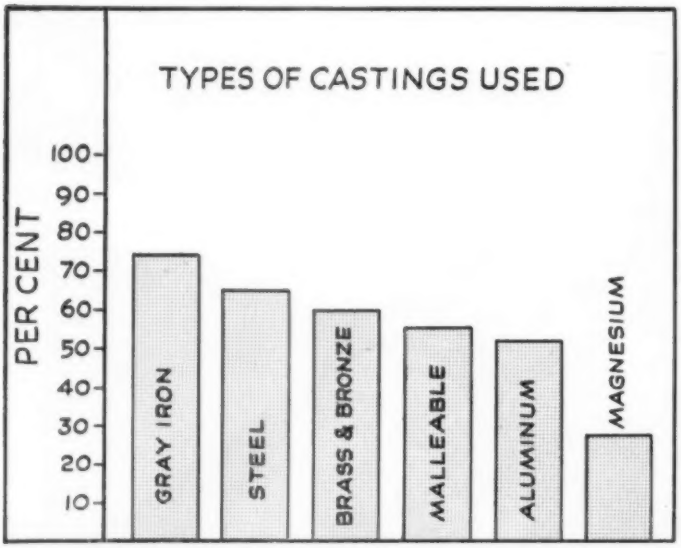
WARTIME developments in production techniques undoubtedly will affect the design of products to be offered in postwar markets. At present it is impossible to measure accurately the extent of this influence on prospective demand for castings; moreover, it is obvious that the volume of production of peacetime goods as a whole will be a more important factor in determining total consumption of castings than will the competitive advantages that have accrued to this or any other material through war-inspired metallurgical progress. Nevertheless, it is desirable at this time for foundries to have some knowledge of the thinking in the metalworking industry regarding the latter's probable choice of materials in the future.

Some light is cast on this subject by results of a study conducted recently by the magazine *Steel* in which users were questioned on their anticipated use of various materials in peacetime products. This study covered 1922 plants which were carefully selected with regard to size, geographical location and type of product so as to give findings that could be considered representative for the entire metalworking industry. No attempt was made to show actual volume of future consumption; the intent was to determine what shifts are in prospect in use of different types of five basic materials—steel, copper and brass, aluminum, magnesium and plastics. In order to simplify the study, some of the engineering materials which have assumed prominence the past few years—including plywood, glass and the minor metals—were not considered in evaluating future material use.

The extent to which castings dominate the form in which metal products recently have been used was disclosed by the study and is indicated in Fig. 3. This shows that 90.2 per cent of the reporting plants use castings. Of the same group 63.1 per cent use stampings, 60.7 per cent use forgings and 43.1 per cent use die castings. Most plants, of course, employ a combination of various of these materials in manufacturing their finished products. For instance, of the plants using castings 63.2 per cent also use forgings, 62.2 per cent also use stampings and 44.7 per cent also use die castings. In addition, castings are used by 88.8 per cent of all plants using stampings, by 93.8 per cent of all plants using forgings and by 93.5 per cent of all plants using die castings.

Relative use of various types of castings is indicated in Fig. 1. The study shows that gray iron is the choice of material of roughly four out of five plants using castings, which means that 72.8 per cent of *all* metalworking plants are consumers of gray iron castings. Similar percentages for other types of castings are 63.9 per cent for steel, 60.1 per cent for brass and bronze, 55.9 per cent for malleable, 52 per cent for aluminum and 27.9 per cent for magnesium.

Of particular interest to foundrymen are replies to the question of whether companies are planning greater or less use of castings in their peacetime products. A summary of the answers is shown in Fig. 2, and the accompanying table breaks down the replies from some of the



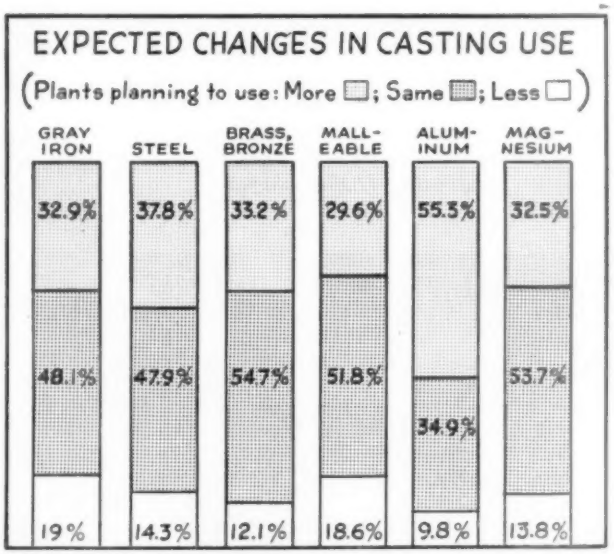


Fig. 1 (left)—Percentages of all metalworking plants using various types of castings. Fig. 2 (right) —Percentages of plants using various types of castings which plan to use more, same amount or less in postwar period

CASTINGS

A study of expected choice of materials in postwar product design indicates sustained or increased use of castings by most consumers. Preferences vary in different industries and according to size of plant

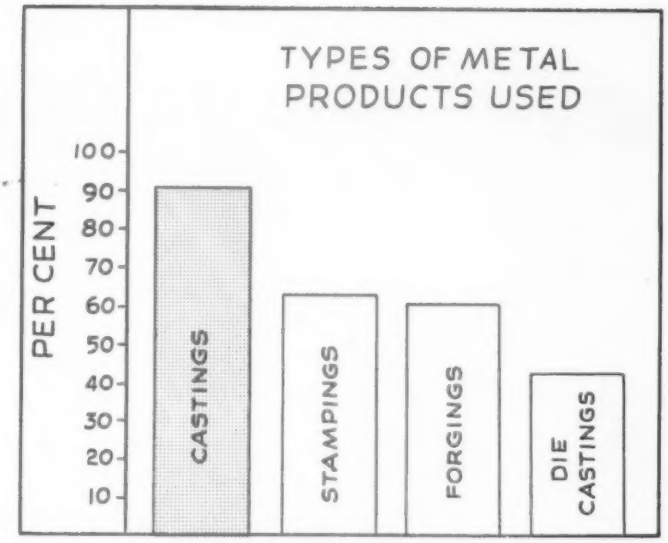


Fig. 3—Percentages of all metalworking plants using metals in forms indicated

more important casting-consuming industries. The chart shows that relatively more users of aluminum castings plan to increase their consumption than do plants using other types of castings. As stated previously, these figures give no clue as to the tonnages involved in proposed changes in use of castings; in this instance the data merely show that 55.3 per cent of the users of aluminum castings plan greater consumption of that product, while 32.9 per cent of those plants using gray iron castings expect to increase their requirements of gray iron, with corresponding percentage gains by users of other types of castings as follows: Steel, 37.8 per cent; brass and bronze, 33.2 per cent; malleable, 29.6 per cent, and magnesium 32.5 per cent.

Only slight variation was shown in the percentage of users of the various ferrous castings which anticipate reduced need for those materials in their peacetime products. Gray iron led with an expected curtailment by 19 per cent of the reporting plants, followed by 18.6 per cent in malleable and 14.3 per cent in steel. In the nonferrous group, 13.8 per cent of the magnesium casting users plan to cut, compared with reductions by 12.1 per cent of the brass and bronze consumers and 9.8 per cent of those plants which have been using aluminum castings.

In all cases the large majority of plants using castings indicate either maintained or greater requirements of cast products in the future. However, this does not necessarily mean that foundries stand to benefit in peacetime markets at the expense of stampings and forgings, since this study also indicates expanding markets for the latter products as well. In some instances greater use of one type of casting probably will mean displacement of some other cast metal, but in many cases the expected gain in consumption reflects prospects for a growing postwar demand for peacetime goods as a whole.

The table showing expectations of casting use in different industries offers some interesting comparisons. Industries in which the percentage of plants indicate an increase in use of gray iron castings greater than the 32.9 per cent average for all users (*Please turn to page* 194)

Prospective Use of Castings by Various Consumer Groups

(Figures in per cent of reporting plants)

	Railroad Equipment	Airplane Parts	Parts—Auto and Machine	Valves, Steam Specialties	Agricultural Implements	Automobiles, Tractors and Trucks	Engines—Oil, Gas, Steam	Heavy Machinery	Special Machinery	Machine Tools
GRAY IRON										
Will use more	14.3	28.6	37.8	37.5	52.9	13.7	42.3	37.2	42.9	25.0
Will use less	28.5	17.1	15.1	10.7	25.5	22.7	9.8	20.9	10.9	16.2
Will use same amount	57.2	54.3	47.1	51.8	21.6	63.6	47.9	41.9	46.2	58.8
STEEL										
Will use more	38.7	36.4	39.1	33.3	58.3	29.2	41.4	42.5	43.4	28.8
Will use less	25.8	9.1	11.8	17.8	16.7	4.1	17.2	5.0	10.3	13.6
Will use same amount	35.5	54.5	49.1	48.9	25.0	66.7	41.4	52.5	46.3	57.6
MALLEABLE										
Will use more	8.4	12.9	27.3	34.0	45.7	24.0	35.7	25.0	36.6	13.9
Will use less	33.3	16.1	16.8	17.1	26.0	16.0	12.5	17.9	9.6	23.3
Will use same amount	58.3	71.0	55.9	48.9	28.3	60.0	51.8	57.1	53.8	62.8
BRASS AND BRONZE										
Will use more	27.6	27.3	27.8	44.8	35.3	23.1	40.3	25.7	36.0	13.1
Will use less	24.1	21.2	14.3	13.8	17.6	7.7	15.3	5.7	9.9	16.4
Will use same amount	48.3	51.5	57.9	41.4	47.1	69.2	44.4	68.6	54.1	70.5
ALUMINUM										
Will use more	28.6	62.9	55.6	48.6	54.2	48.2	53.8	29.6	61.0	59.3
Will use less	23.8	11.4	9.5	13.6	8.3	11.1	12.4	7.4	7.3	12.9
Will use same amount	47.6	25.7	34.9	37.8	37.5	40.7	33.8	63.0	31.7	27.8
MAGNESIUM										
Will use more	20.0	27.3	24.7	35.0	21.4	58.8	29.7	30.0	33.3	20.0
Will use less	33.3	18.2	18.2	15.0	21.4	...	8.1	5.0	13.0	8.0
Will use same amount	46.7	54.5	57.1	50.0	57.2	41.2	62.2	65.0	53.7	72.0

Coke Properties and Cupola Melting

By B. P. MULCAHY
Research Engineer
Citizens Gas & Coke Utility
Indianapolis

SIZE and character of material in connection with cupola operation have been discussed many times, but it is advisable again to call attention to them because of their manifold influences.

Excessive quantities of iron with sections either too thin or too thick are undesirable. In the first instance, the iron, because of its increase in surface, may carry with it an excess of rust, creating a greater burden for the slag and in addition these sections melt very rapidly so that this iron runs ahead of the balance of the charge and disturbs the calculated composition. Sections which are too heavy melt so slowly that they lag behind the balance of the charge and again the composition is disturbed.

Another factor to be considered is the bulkiness of the material charged. A good example of this is the complete motor block. While the sections are thin, the whole block, if charged as such, takes up so much space the quantity of iron charged in the stack is reduced. This condition is particularly undesirable in small diameter cupolas, because of the danger of bridging as well as the loss of preheating.

To illustrate, a solid block 4 x 4 x 6 inches has a total exposed surface area of 128 square inches. If this block were cut into 16 pieces sized ¼ x 4 x 6 inches we would then have a total exposed surface of 844 square inches or an increase of nearly 700 per cent. Weight of the material remains the same, but the quantity of rust and the absorption of sensible heat under the same conditions of operation would be altered considerably.

In moderate quantities the type of iron mentioned can be used satisfactorily, but judgment must be exercised for the preheat temperature of the iron when it reaches the melting zone is largely dependent on this factor and it is essential that the iron be preheated properly at this zone to permit uniform melting, and, of course, iron composition.

Burned iron, such as grate bars, fire pots, annealing boxes, etc., should not be incorporated in any mix for cupola operation, except in the instance where metal characteristics or composition are unimportant. This material, because of its high state of oxidation, cannot be reduced in the time allotted to melting in this furnace and consequently it can be entrained in the metal with its resultant poisonous effects. This material has such a potent effect on the metal that even relatively small quantities seriously

Influence on cupola operations of various physical and chemical properties of foundry coke are discussed in this second and concluding article. The first part appeared in October

affect metal quality in the same manner as oxidizing conditions from an improper coke balance.

We have purposely avoided references to coke or its characteristics in the previous sections of this presentation, in order that we might discuss both its isolated and correlated influences on the process. This we will now do.

The assay of any commodity is an attempt to measure those characteristics which are believed to influence its application. Coke is a material which requires measurement of properties which are composites of several factors, and therefore, this fact must be taken into consideration for proper evaluation.

An analysis of a coke is usually divided into two groups of characteristics, chemical and physical, and these are: Physical properties which include such items as size, strength (shatter test), hardness (tumbler test), weight per cubic foot, cell space, porosity, specific gravity, and chemical properties which relate to volatile matter, fixed carbon, ash, sulphur, fusion point of ash, composition of ash, combustibility, and ultimate composition.

We are not concerned with many of these individual factors at this time for, in their normal range of occurrence, their effect upon cupola operation is either insignificant or none at all. Effects of some of these factors, such as ash and sulphur, are quite generally known and will not be considered here. The volatile matter content when it exceeds a certain percentage has an appreciable influence on the combustibility of the coke, but in general, this factor is closely controlled by the manufacturer and only infrequently is difficulty encountered on this score. Several of the other factors, while measurable, may have their influence included in some of the other characteristics. For a more

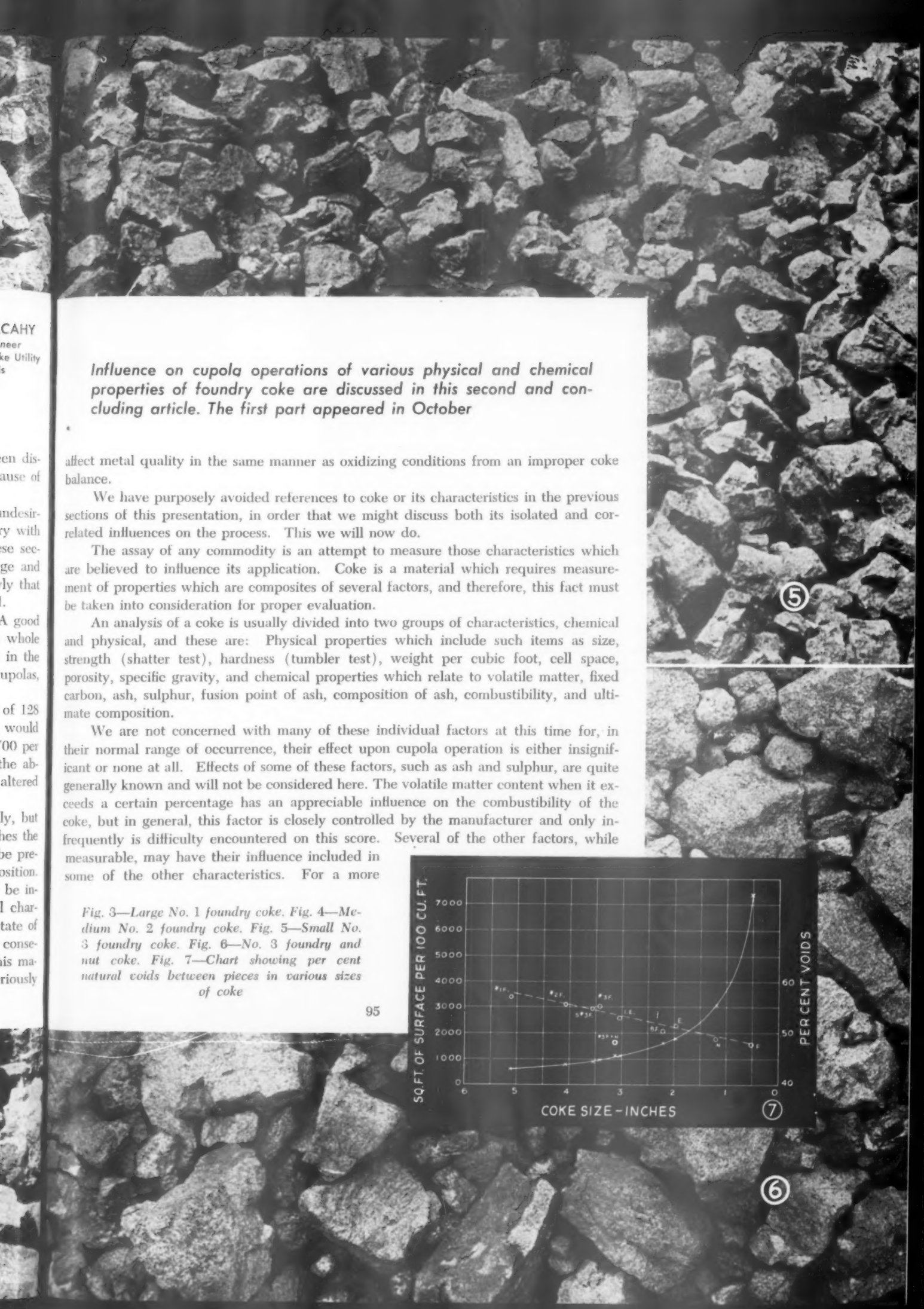


Fig. 3—Large No. 1 foundry coke. Fig. 4—Medium No. 2 foundry coke. Fig. 5—Small No. 3 foundry coke. Fig. 6—No. 3 foundry and nut coke. Fig. 7—Chart showing per cent natural voids between pieces in various sizes of coke

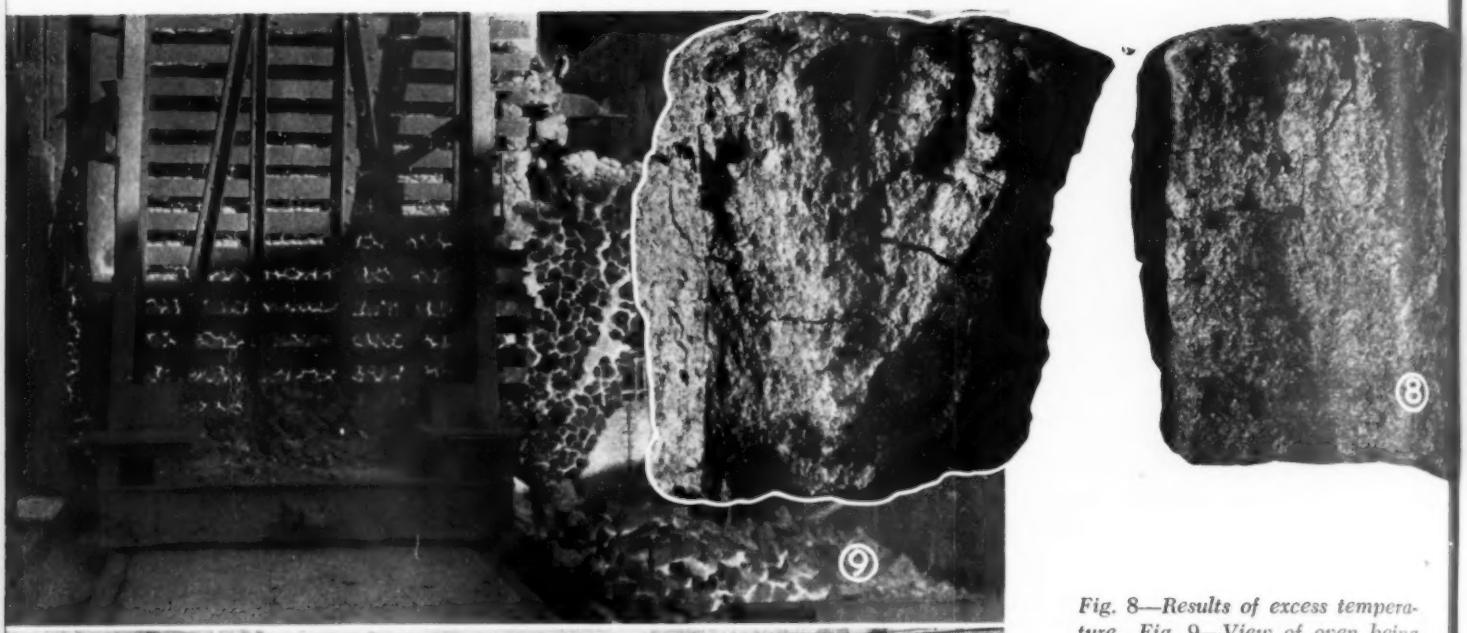


Fig. 8—Results of excess temperature. Fig. 9—View of oven being pushed, side view. Fig. 10—Run-of-oven coke on wharf. Fig. 11—Grizzly screen. Fig. 12—Front view of oven being pushed

complete discussion of some of these factors the reader may refer to the bibliography.[5]

We are most concerned with the physical properties of the coke, for these factors in most instances exert by far the greatest effect upon the performance of the coke. The principal factors in this category are as follows: Size, strength, weight per cubic foot, porosity and cell size, and of these if we consider size and strength alone we will have an index of coke quality more important in general than all of the other factors combined, for they represent to a very large extent the composite effect of the coal and the process of carbonization.

Size and strength of coke are synonymous, for they both are directly related to the fissure development in the coke and the resistance of this same coke to degradation under physical handling is a function of the same properties. We will illustrate this point later.

First, consider size alone. Fig. 7 shows the per cent natural voids between the pieces in various sizes of coke. The data for the curves is contained in Table III.

The index used is a weighted average size obtained by a complete screen analysis. As the curve indicates the greater per cent of voids occurs with the largest coke size, which means that a given volume will contain a lesser quantity, by weight, of a larger sized coke. The second curve on this chart, coke size vs. surface area, is a composite of the voids and area per pound computed to the same volume. In computing these areas cube surfaces were used. Spheres could also have been used to show the relative area change with size. This curve gives striking evidence to the fact that surface area increases in direct proportion to the size decrease. In other words, a 2-inch coke has twice the surface area of a 4-inch coke.

Full effect of this factor cannot be appreciated, however, until we go a step farther and consider what happens when we have a coke with a wide spread in size-consist. A No. 3 foundry coke (4 x 3 inches) was loaded in an 8 cubic foot box and its weight per cubic foot determined. Nut sized coke (1½ x ¾-inches) was added to this coke to its saturation point. The weight per cubic foot of the mixture was again determined. These tests were listed in Table III marked with the asterisk.

We note that the void space has decreased 6.5 per cent (from 54.8 to 48.3 per cent), the weight per cubic foot has increased 3.8 pounds or 14.5 per cent, the average particle size has decreased 0.19 inch and the surface area correspondingly increased 23 per cent. While this is a prepared sample the same effect takes place with a weakly structured coke as it breaks in handling and often to a greater extent than the example used.

Figs. 3, 4, 5 and 6 will show the average size-consist and appearances of foundry sizes No. 1, No. 2 and No. 3 and the mixture of No. 3 with nut. They will give a general idea of the sizes of voids encountered in coke ranging from 3 to 6 inches, when the pieces in each size range are fairly uniform.

Value of this relationship lies in our interpretation of its effect. It can be stated that other conditions remaining the same, the rate of combustion of any coke is a function of the type of carbon present and the particle size. In other words, a coke of 2 inches average size with a residual volatile matter content of 2.0 per cent will burn faster than a 2-inch coke with only 1.0 per cent volatile matter content. This is true because the influence of the additional 1.0 per cent volatile matter lowers the ignition point of the coke appreciably, and the oxygen surrounding the coke particle is consumed more rapidly in the reaction with the carbon. With this same coke also the rate of decomposition of the CO_2 is faster, which means that after the O_2 is consumed or depleted the CO_2 decomposition can proceed at a faster rate, temperatures, of course, permitting. Effect of a coke of this nature is to narrow the zone of maximum temperature in the bed where O_2 exists, and the secondary reaction of CO_2 decomposition tends to produce lower temperatures over a broader zone above the combustion area.

This same effect of change of rate or reaction is also a function of coke size, because of the differences in exposed coke area. The writer firmly believes that this effect of size is more important than the change in character of the carbon (encountered in normal carbonizing practice) in the influence on overall temperatures and reaction rates in the combustion of coke, and further that a coke with a wide range of sizes cannot be controlled in its combustion rate nor give the same thermal efficiency as a similar coke uniformly sized.

The wide range of sizes we produce and their consequent extreme diversity of industrial use has demonstrated time and again the effect of size upon combustion rate. This reference to combustion rate must not be confused with the inherent combustion characteristics due to type of carbon. What we mean is the rate of combustion of coke under actual operating conditions. Invariably when the size of coke is decreased either by design or accident, the maximum temperature zone is shortened and lowered closer to the point of oxygen (*Please turn to page* 222)

Table III
Coke Sizes vs. Voids and Surface Area

Size	Solid Wt./Cu. Ft. Lb.	Actual Wt./Cu. Ft. Lb.	Per Cent Coke	Per Cent Voids	Avg. Size Ins.	Surface Exposed (Assuming Cubes) Sq. Ft. Per 100 Cu. Ft.	Surface Exposed (Assuming Cubes) Sq. Ft. Per 100 Lb.
No. 1 Foundry	56.4	24.30	43.1	56.9	5.12	604	24.9
No. 2 Foundry	56.4	25.12	44.5	55.5	4.08	785	31.2
Spec. No. 3 Foundry*	55.3	25.00	45.2	54.8	3.57	909	36.4
No. 3 Foundry	56.4	25.35	44.9	55.1	3.42	946	37.2
No. 3 Foundry & Nut*	55.3	28.60	51.7	48.3	3.24	1150	40.2
Ind. Egg	56.4	26.60	47.2	52.8	3.051	1110	41.7
Blast Furn.	56.4	28.00	49.6	50.4	2.221	1604	57.3
Egg	56.4	27.40	48.6	51.4	1.973	1777	64.6
Nut	56.4	28.80	51.1	48.9	1.199	3070	106.6
Pea	54.5	28.40	52.1	47.9	0.51	7350	259.0

Q and A

Oxidized Iron Causes Shrinks

Q.—We have been making small ingot molds, billet mold and pig mold castings with risers on the pads. In some instances the gate enters the pad. Recently we have found excessive shrinkage in the pads after machining. The opinion has been expressed that pig iron burned in the blast furnace is responsible. Approximate analysis of the iron in the castings is total carbon 3.70 per cent, combined carbon 0.70 per cent, silicon 1.50 per cent, manganese 0.70 per cent, sulphur 0.10 per cent, chromium 0.65 per cent. We shall appreciate your advice on the following points: (a) Will burned iron cause excessive shrinkage? (b) What form of test is employed to determine the burned condition? Will a micrograph or a macrograph disclose the evidence? (c) Is there such a thing as burned iron, or are we barking up the wrong tree?

A.—Taking your questions in reverse order there definitely is such a thing as burned or oxidized iron. Researches conducted by the late Dr. Moldenke led him definitely to the conclusion that extremely small percentages of dissolved iron oxide are responsible for different physical properties in pig irons of apparently similar composition. The subject is covered extensively in his well-known work *Principles of Iron Founding*. Several years ago the United States Bureau of Standards conducted a careful analytical investigation of this peculiar phenomenon. The resulting report including methods of testing and all other related features is available upon application. *Transactions* of the American Foundrymen's Association, Vol. 37, 1929, page 91, contains an extensive paper "Quality of Pig Iron and Castings as Affected by Blast Furnace Practice" presented by A. L. Boegehold at the Chicago convention of the association. However, since the theory up to the present has not been accepted unanimously by metallurgists, and since you probably are more interested in the condition than you are in the theory, it may serve your purpose more adequately to suggest a remedy while using this high shrinkage iron. This remedy is in the form of a leaf from the steel foundryman's book. Use larger risers and gate the casting in a manner to promote directional solidification.

Air Bubbles in Plaster Molds

Q.—We are having difficulty in preventing air bubbles from forming in corners and along sharp edges of plaster molds. Can you give us any suggestions on how that difficulty may be eliminated?

A.—One of the characteristics of gypsum cement or plaster of paris is the tendency to form pinholes or air pockets along the interface between plaster and pattern, and precautions must be taken if those are to be eliminated. First is the preparation of the liquid cement or plaster, and the manufacturers directions should be followed exactly as to weights of cement and water, and sifting the cement into the water. The mixture is allowed to stand undisturbed from 2 to 5 minutes, and then mixed by hand or mechanically. In hand mixing the mass is stirred from the bottom up in such a manner that air is not beaten in. In mechanical mixing the action of the propellor is such as to force the mixture downward.

In pouring the plaster or cement into the flask over the pattern, it should be poured from one side so that the air is driven ahead of the liquid mass. Air bubbles which may form can be broken up by jarring or vibrating the mold during the pouring operation. Another method is to tamp the liquid plaster with a stiff bristle brush. In the latter only a small amount of plaster is poured over the face of the pattern, sufficient to cover it for an inch or so. Brush should be rinsed thoroughly immediately after use to prevent plaster setting at base of the bristles.

Better Feed Eliminates Leaks

Q.—In pouring 60-pound valve body castings we are experiencing periodic porosity in the main body (in gate on riser) and more especially in the flanged ends. We do not have heat control over the metal being poured. Castings are made from a 30 per cent steel mix with the addition of about 0.34 per cent molybdenum.

A.—So little information is given on the leaky valve castings that it is difficult to suggest any concrete solution. However, our guess is that the leakage or porosity causing the leakage is due to lack of feed. Nothing is mentioned on how the castings are gated and risered, but since a high steel scrap mix shrinks more than a soft gray iron, gates and risers should be ample. Therefore, we suggest that size of the risers be increased without too much necking. If only whistlers are used on the flanges, they should be increased to at least the thickness of the flanges to form risers. Also the cope should be at least 6 inches deep to supply sufficient ferrostatic pressure for good feeding.

Wet Lining Causes Porosity

Q.—We are sending to you some castings and sprues which show considerable porosity. They were poured from the second bull from a side holding ladle, and while the operator was finishing pouring, the iron backed up in the sprue causing it to mushroom. The only unusual thing about the bull ladle was that it was somewhat damp in the upper portion of the lining. The iron was agitated as it was poured into the hand ladle, and all castings poured from the bull ladle contained the holes. After the remainer of the iron was pigged, it gave off considerable stars and sparklers. It would seem that the damp lining does not always cause the trouble as we have seen iron poured from such ladles giving sound castings, or at least they appeared that way.

A.—While awaiting your letter of explanation we examined the castings, and ventured an opinion that the honeycomb appearance resulted from gassed metal presumably caused by a wet lining in the ladle. Your letter confirms that, especially in that portion where you mention that the iron was agitated considerably, or as it is expressed in foundry parlance—the iron boiled. The reason that the agitation or boiling occurs is that the molten metal con-

verts the water in the damp lining to steam, and probably dissociates some of the steam into its component elements oxygen and hydrogen. Some of those gases are held in solution in the metal poured into the mold, and are prevented from escaping by the solidification occurring when the metal strikes the cold sand. However, in the heavier sections the center remains molten for some little time, and when the gas pressure rises sufficiently by reason of solidification of the iron, it forces some of the still liquid metal out through the sprue.

Your remark that damp linings do not always result in the phenomenon described is true to the extent that it will depend upon the amount of moisture in the lining, temperature of the metal and the length of time the metal is held in the ladle before pouring. With low moisture only a small amount of gas is formed, and if the metal remains in the ladle for an appreciable amount of time before pouring, most of the gas can escape. However, to eliminate any trouble it is essential that the ladles be absolutely dry before use. Such practice will provide one less variable to watch, and you know there are plenty of those without adding any more.

Give Data on Manganese Steel

Q.—What is meant by the term high manganese steel? We shall appreciate a brief reference to the composition, method of manufacture, heat treatment, physical properties and ultimate use.

A.—The composition of austenitic, also known as high manganese, or Hadfield's manganese, steel, varies to some extent for specific castings, but lies between 1.00 and 1.40 per cent carbon, 10.00 and 14.00 per cent manganese, 0.30 and 1.00 per cent silicon, 0.06 maximum per cent sulphur and 0.10 maximum per cent phosphorus. Manganese steel for castings may be melted in any of the recognized types of melting equipment, open hearth, electric furnace, converter, or crucible. Heat treatment is the most important factor in the sequence of operation. Castings are heated to a temperature generally between 1875 and 1925 degrees Fahr. and then quenched in cold water. If improperly heated or quenched, portions of the cementite either may remain undissolved because of insufficient time or temperature of heating, or may come out of solution again because of too slow cooling during the quench. In either case full strength and toughness are not secured.

On the other hand properly heat treated austenitic manganese steel castings become brittle when reheated for a long time to temperatures above 650 degrees Fahr., or exposed for a short time to a temperature of 750 degrees or higher. Shrinkage allowance for manganese steel is approximately 5/16-inch per foot. Unequal sections should be avoided and thickness of section should be kept within reasonable and proper limits. It is practically impossible to quench pieces properly over 5 or 6 inches in thickness. Austenitic manganese steel is commercially unmachinable. Castings are finished by grinding. Physical properties include: Tensile strength 80,000 to 110,000 pounds per square inch; elongation in 2 inches 15 to 35 per cent; reduction in area 15 to 35 per cent; bend test 180 degrees.

Gate Causes a Local Hot Spot

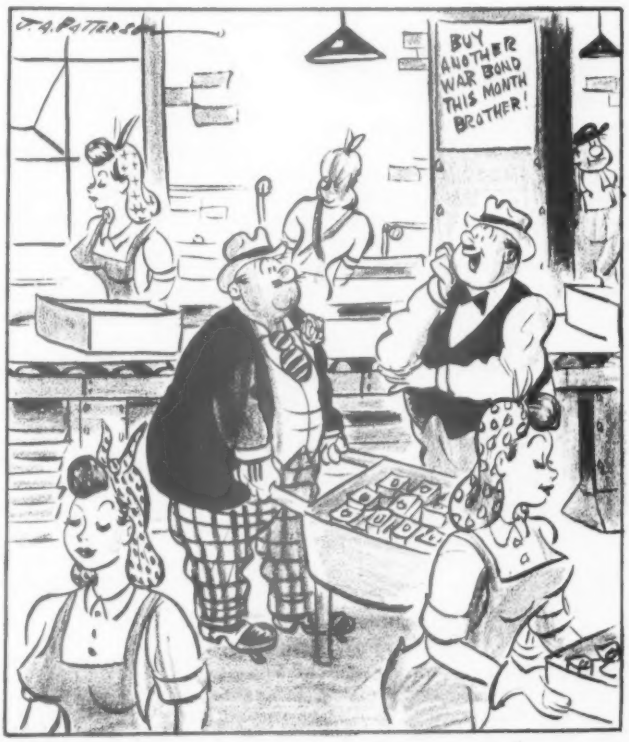
Q.—We are forwarding for your inspection a corner piece from a casting weight 100 pounds, thickness ⅜-inch, with 90 pound core in the side. Analysis of the iron shows: Total carbon 3.46 per cent, silicon 2.28 per cent, sulphur 0.11 per cent, manganese 0.65 per cent, phosphorus 0.45 per cent. The defect which appears to be a shrinkage has been more prevalent than usual the past few weeks. Is the composition of the metal responsible?

A.—The inquiry does not supply enough information on which to base a proper diagnosis of the defect in the piece of casting which accompanied the letter. The defect, as you correctly surmise, definitely is caused by shrinkage, but shrinkage, that is localized shrinkage, may result from any one of several causes. Without a knowledge of all the circumstances, shape and size of the casting, shape and position of the gates, type of flask, density of ramming and other features, it is practically impossible to lay a finger on the exact cause of the shrinkage area.

The composition of the iron is not a factor. The analysis is quite suitable for the thickness of section. We might venture a guess based on the assumption that the metal is poured through a single wedge gate on top of the casting, and falls continually on the face of a dry sand core until the mold is filled. Obviously, the core area immediately below the gate will be raised to an exceedingly high temperature and will maintain the metal in that vicinity in a liquid condition until after the metal in the thin gate edge has solidified. When shrinkage takes place, the gate cannot supply any more and as a result a shrinkage cavity is formed under the gate. We suggest changing position of the gate so that the metal will fill the mold rapidly and uniformly without developing a local hot spot in any area.

GANGWAY!

By J. A. Patterson



Oh, I see—you think a man should look his best these days, eh Hargenson.

Bronze Disk Splits In the Center

Q.—We have had trouble with a solid 85-5-5-5 bronze disk 1 inch thick, and 6 inches diameter, machined all over and drilled for bolt holes. The casting shows a distinct crack horizontally through the center. We have been making these castings for several years without any trouble. Metal is poured at 2200 degrees Fahr. through a 1-inch diameter sprue and two small branch gates at one side. A gate diagonally opposite is connected to a 2½-inch diameter riser.

A.—Apparently if these castings have been made for years without any trouble, some factor in the sequence of operation must have been changed recently. A possibility exists that some of the former castings may have had the same form of defect, but not to a sufficient extent to be visible. The crack or cleavage plane horizontally through the center is a form of cold shut, the result of one or possibly a combination of two or more causes. The metal may have been poured too slowly, or the stream may have been intermittent. The metal may have been over-heated.

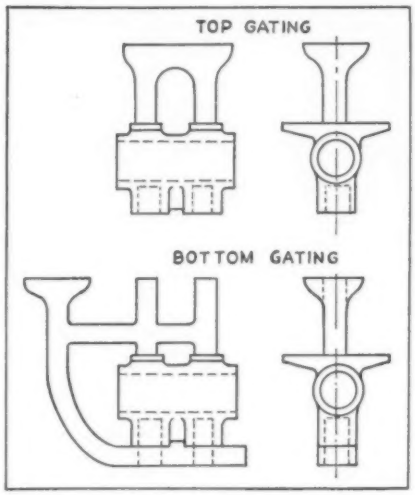
It is not considered good practice to pour a solid little casting of this kind at a temperature of 2200 degrees. You do not state whether the casting is made singly or in a group of two or more, or whether the mold is sand or iron. If the casting is one of a group, it is possible that some of the molds do not receive the metal as rapidly as the others. If the casting is made in a metal mold, a possibility exists that the oil or other coating is too heavy and flares up sufficiently to deposit a coating on the face of the metal rising in the mold.

Whatever the reason, the fact remains that a film forms over the face of the casting when the mold is about half filled. The remainder of the metal flows in, but becomes attached only to the lower layer in spots. The gating system is partly responsible since it sends a stream of metal in two opposite directions. The streams meet and further horizontal movement stops. Any scum or film remains stationary. Melt and pour the metal at a somewhat lower temperature. Pour the metal steadily into the mold through a single gate set tangentially. This will give the metal a mild whirling motion in the mold and prevent the formation and anchoring of a film.

Black Spots Appear on Aluminum Castings

Q.—We are forwarding for your consideration three permanent mold aluminum alloy castings which contain little black spots on the interior after machining and polishing. The alloy contains 7 per cent silicon, 0.2 to 0.4 per cent magnesium, 0.2 per cent maximum copper, 0.5 maximum iron, and remainder aluminum. We have tried various methods of gating, fluxing, and combinations of ingot and remelt to straight ingot charges without result. At present we are using 100-pound charge which is brought to 1300 degrees Fahr. in a combination melting and holding furnace with a graphite crucible where none of the products of combustion come in contact with the metal. Metal is fluxed with a proprietary material placed in a paper sack and forced to the bottom of the crucible. The dross is skimmed off and then a proprietary cover material is placed on the metal. After the aluminum has settled down we skim back a portion and start casting. When about three-fourths of the metal is used up, the described practice is continued. We believe the black spots or specks to be aluminum oxide. Our losses range from 10 to 20 per cent. Do you think we are asking the impossible in trying to eliminate the specks entirely?

A.—Fracture of one of the castings submitted reveals the presence of some dross in the structure at various points, and also that the casting is not being fed as well as it might be. Hence, the black specks or spots mentioned may result from either a particle of dross being dragged out in machining and polishing operations, or from opening up of the minute interstices resulting from lack of feed. The reason we cannot be specific as to the cause of the specks indicated is due to the hole being filled with polishing compound. You can fracture some castings after dry machining, but before polishing to determine the exact cause. However, we can see no reason why both dross in the casting and lack of feed cannot be eliminated by giving careful consideration to procedure and mold design.



Sketches showing two methods of gating brackets made in permanent mold

First of all we think that you should study your fluxing methods. You mention placing the flux in a paper sack and forcing it to the bottom of the crucible. That is the only way to get effective results, provided the material is held at the bottom until action ceases. Also be sure that the flux is absolutely dry. Then the metal should be allowed to stand at temperature for say 10 minutes without disturbance to permit coalescence of the dross particles. After that period of rest the pot is skimmed with the least disturbance of the metal and poured. We note that you use a cover flux, and wonder if possibly some of the trouble may not be due to not holding that back properly. Try pouring without and with the cover flux, and observe the results obtained. Possibly some of the trouble may originate in pouring practice. Lip of the ladle should be held as closely to the sprue opening as possible, and the metal stream held constant without a break in the oxide envelope until casting cavity is filled. The pouring should be of sufficient volume to fill the sprue and keep it filled.

While we are not expert permanent mold designers it appears to us that your present gating and risering method wastes considerable metal without accomplishing its proper function of producing a solid casting. To us the entrance gates defeat the purpose of permitting the metal to enter the cavity quietly since their small size tends to produce a jet effect. Not only that, but we believe that they freeze off and do not permit feeding between riser and the heavy brackets into which they lead. The choke should be in sprue before the metal enters the riser, and not between riser and casting.

Perhaps you went to the particularly elaborate style of gating in an effort to eliminate your trouble. However, we believe that good sound castings can be made with less metal by top gating directly into the heavy brackets. It also could be bottom gated by designing the mold with the brackets at the top as for top gating, but feeding the metal into the branch openings which are at the bottom through a horn sprue. Two risers about ⅜-inch in diameter over the brackets would give good feeding, and that could be further insured by running a branch from the horn gate into the risers which would conduct hot metal to those directly as soon as the casting cavity filled to that point. Incidentally, we think that the taper on the core going through the body is much greater than necessary, and could be reduced at least to half of the present taper if not more.

Wants Core for a Heavy Section

Q.—We are making a semisteel die casting weighing approximately 2500 pounds, with four lugs 7½ x 9 x 7 inches spaced 90 degrees apart on the circumference. Each lug has a cored slot 1½ x 3½ inches and 7 inches deep through the center. Because of the high temperature and the heavy section of metal we have been unable to make a core that will leave a clean slot true to dimensions in which the tolerance is only 1/32-inch.

A.—Several methods are practiced by foundrymen confronted with the problem of coring a clean, true-to-dimension hole in a heavy section of metal. In exceptionally severe cases the tinsmith forms a casing. This is packed with core sand and dried. Apparently a thin film of metal is formed when the molten metal comes into contact with the container and thus protects the core for the initial period while the metal in the

(*Concluded on page* 102)

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(*Concluded from page* 100)
mold is at maximum temperature. In a variation of this method the core is wound spirally with fine steel wire. However, in the present instance we do not think this measure is necessary.

A sand core made from a suitable mixture, properly dried, vented and coated with either plumbago or silica wash should serve satisfactorily. In some instances a 10 per cent plumbago addition to the usual oil sand mixture will form a clean opening. Some foundrymen prefer to use a 10 per cent addition of coal dust or wood flour. The basic idea is to use a clear silica sand which provides the necessary refractoriness, and some combustible material that will burn out to release the sand grains instead of fusing them together. To complete this burning out process, the core is vented to a greater extent than usual. For example, three ¼-inch vent holes from end to end are not too many in a core 1½ x 3½ inches.

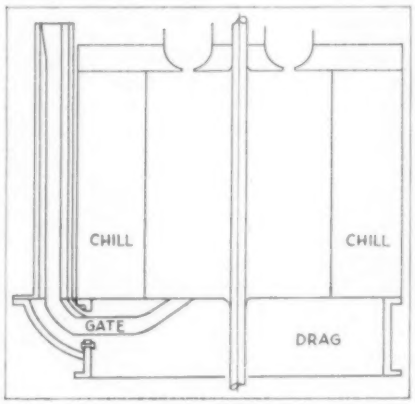
Roll Requires Hard Iron Mixture

Q.—We are having trouble with a cast iron roll 18¼-inches diameter, 20¼-inches in length with a 4½-inch diameter shaft through the center. The body of the roll is cast in a one-piece chill. Metal is poured through a group of four ⅞-inch pop gates on the top face and fed through two 3-inch diameter risers. The iron is low in sulphur and phosphorus and shows a silicon content of 1.75 per cent. There is an allowance of ⅛-inch for grinding finish on the face. The casting is not hard enough in the center, and the face in contact with the chill is rough and dirty. We have tried painting the face of the chill with a core wash, also with a light coating of oil. Is ⅛-inch sufficient allowance for finish? Is the chill coating responsible for the rough face? Is our iron suitable for the purpose?

A.—To secure a hard composition in your roll casting, the silicon content should be in the vicinity of 0.75 per cent. Unless it is a typographical error, we can not understand how you would expect to produce a hard iron casting 18 inches diameter and 20 inches in length from iron with a silicon content of 1.75 per cent. The chill coating is only indirectly responsible for the rough and dirty face. The direct cause is the speed of pouring. Chilled castings should be poured rapidly. Molten metal is covered with a thin film which increases in thickness as the metal loses temperature. Where the metal rises slowly in contact with the chill, this film and surface tension causes the metal to advance in a series of short waves, instead smoothly and evenly.

Each advance leaves a mark, a ridge or worm track on the face of the casting. Any slag or other foreign material, and this includes residue from combustible chill coating material, which comes in contact with the chill, immediately stops floating. It remains firmly anchored to the chill face and comes to light when the casting is cleaned. The usual practice in roll shops is to coat the chills with a thin carbon base wash, approximately 90 per cent ground coke and 10 per cent clay. Foundry supply houses are prepared to furnish a special wash material for roll chills.

In standard roll shop practice, the metal enters through a tangential gate leading into the lower neck. The iron is poured very rapidly and the tangential gate gives it a whirling motion as it rises in the mold. In this manner the iron is prevented from lingering even momentarily to form ridges or wavy indentations. Also the modified centrifugal action tends to hold any lighter foreign material in the center, instead of coming in contact with the chill face. By remaining in the center this foreign material eventually rises into the sink head. This particular type of gate cannot be applied to your roll, since it has no neck. An adaptation of the method is shown in the accompanying sketch. However, your present method of pop gating on the top may serve, provided you use 10 or 12 and pour the metal as rapidly as possible. Instead of the regular type cope flask, it might be advisable to use a flat cover core about 4 inches in thickness. In addition to the gate openings, the 3-inch neck openings for two 5-inch diameter risers could be formed in this core.



Adaptation of tangential gate for neckless roll casting

Wants Information On Oven Design

Q.—We will appreciate receiving information on the constructional details of a small core oven 3½ x 3½ x 6 feet heated by electricity. What thickness of insulation should be used?

A.—While construction of a core oven appears to be rather simple, there are a number of factors to be considered if it is to operate efficiently and economically. For example, heat distribution is important to obtain uniform baking; heat input should be correlated to the load to be baked, and ventilation must be such that sufficient air enters to oxidize the binder properly as well as carrying off the volatile gases—but not so much so that the heat is carried away too rapidly. Hence, we believe that you will be much further ahead to purchase an oven constructed by a firm experienced in the field, rather than to try to build one yourself. Oven builders are conversant with all the factors to be considered and design their ovens so that they will bake the cores efficiently and uniformly at low cost.

Rusting Appears on Manganese Bronze

Q.—We are making manganese bronze rudders according to Navy specifications, and noticed on calling on one of our customers a pile of those in the yard which appeared to have rust spots similar to iron. No iron was near the rudders. Castings are covered by federal specification 49B3c and carry a low percentage of iron. Inasmuch as we are making no additions to the ingot, we cannot understand the appearance of the rust spots on the rudders.

A.—Almost all of the manganese bronzes that conform to a government specification necessarily have some iron in solution, and when the iron precipitates on the surface during the process of solidification, those microscopical particles in the skin of the casting may rust when casting is exposed in the rough to weather conditions. We assume the castings you describe as showing rust spots are in the rough.

When the castings are machined they should not show rust spots under normal conditions. If perchance some spots do show up on the finished surface on exposure to weathering, the explanation lies in the condition of the metal from which the castings were made, and we suggest that you discuss the problem with the suppliers of your ingot metal. They will give you the fullest co-operation in overcoming any trouble.

Salt Bath Pot Usually Made of Steel

Q.—We have done some experimental work on producing salt pots in alloy irons for use in heat treatment of steel parts. Salt mixture employed is the accelerated type at temperatures from 1600 to 1800 degrees Fahr., and we have had little success. We have tried alloy iron containing 14 per cent nickel, 7 per cent copper, and 2 per cent chromium made by mixing cupola iron with alloys melted in gas-fired crucible furnaces, but the material is unsatisfactory for salt pots. Do you have any suggestions?

A.—It is our understanding that as a general rule cast pots used for salt baths operating at high temperatures such as you mention are high alloy content steel containing 25 to 40 per cent nickel and 14 to 20 per cent chromium. References have been made to the application of the 14 per cent nickel, 7 per cent copper, 2 per cent chromium cast iron in cyanide pots with favorable service life, but that with chloride and carbonate baths the life is much less which bears out your experience.

A PICTOGRAPH *of efficient dust distribution*

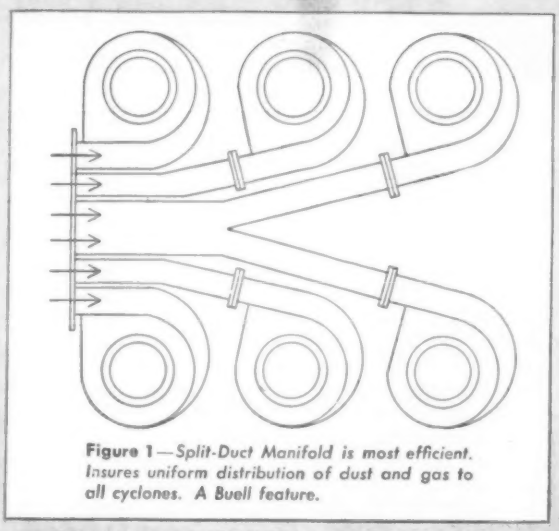


Figure 1—*Split-Duct Manifold is most efficient. Insures uniform distribution of dust and gas to all cyclones. A Buell feature.*

THE MOST EFFICIENT METHOD *(Buell's)*

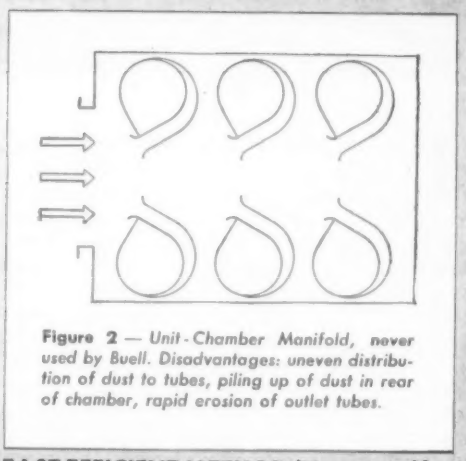
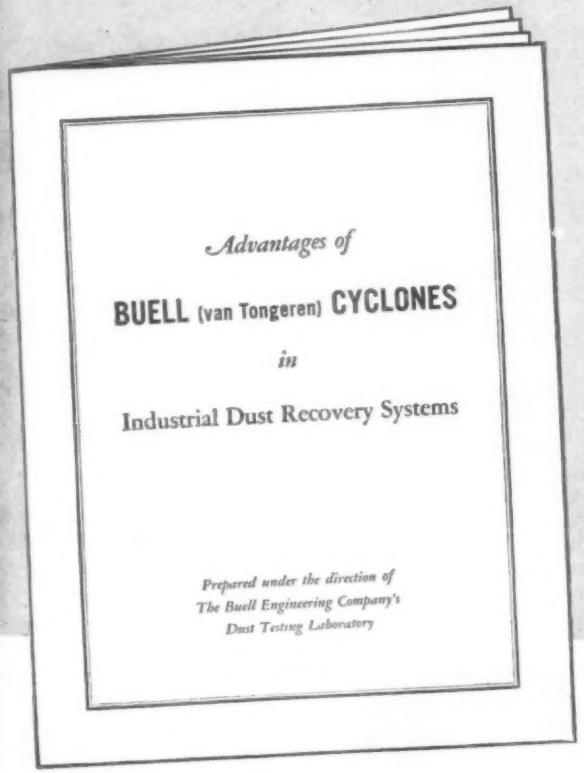


Figure 2 — *Unit-Chamber Manifold, never used by Buell. Disadvantages: uneven distribution of dust to tubes, piling up of dust in rear of chamber, rapid erosion of outlet tubes.*

THE LEAST EFFICIENT METHOD *(Never used by Buell)*



BOTTOM VIEW OF MANIFOLD ASSEMBLY

Every engineer and operating executive should have a copy of the bulletin shown above as his guide in the selection of the right dust collection equipment.

Buell Design ELIMINATES CLOGGING MINIMIZES EROSION

The scientific development of inlet manifolding for multiple unit cyclone dust collectors has played an all important part in the uniform distribution of both gas and dust in cyclone collectors. How proper manifolding is achieved in Buell Dust Recovery Systems is shown in the pictograph on this page. What happens when the dust load is not uniformly distributed, and how serious these disadvantages may be, is best described in the bulletin shown on this page, from which these two manifold sketches were taken.

buell
DUST RECOVERY SYSTEMS

BUELL ENGINEERING COMPANY, INC.
14 Cedar Street, New York 5, N.Y.
Sales Representatives in Principal Cities

DESIGNED TO DO A JOB, NOT JUST TO MEET A "SPEC"

MEN ... of Industry

HARRY E. LADWIG has been appointed works manager of the West Allis foundries and pattern shops of Allis-Chalmers Mfg. Co., Milwaukee. Previously he had been assistant general superintendent. Mr. Ladwig joined Allis-Chalmers in March, 1909, after completing special business school training. Starting out in the foundry, he also served in the pattern shop, shipping room, machine shops, and office. An active member of the Wisconsin Chapter of the A.F.A., Mr. Ladwig recently was elected president of the group for 1944-45.

♦ ♦ ♦

David B. Joseph has been appointed representative in the southern Ohio district of Samuel Greenfield Co., Buffalo, with headquarters in Cincinnati, where he will handle all sales of brass, bronze and aluminum ingots as well as the purchase of nonferrous scrap. Mr. Joseph, who served for many years as vice president and treasurer of Edna Brass Mfg. Co., Cincinnati, has a wide background of experience in the brass, bronze and aluminum industries.

♦ ♦ ♦

John W. Gardom, recently elected president of the Institute of British Foundrymen, is a consulting engineer, specializing in foundry installations. He has served on the technical committee of the institute since its inception and for the past 12 years has been its convener. In 1929 he was president of the London branch of the institute. Mr. Gardom received his early technical training at Manchester College of Technology and Manchester University. Upon leaving the university he became assistant chemist in the metallurgical laboratories of Midland Railway Co., Derby and in 1917 held a technical position at the Royal Aircraft Establishment, Farnborough, and with the electro metallurgical department of the Ministry of Munitions. He was chief metallurgist with the Skefko Ball Bearing Co. Ltd., Luton, after the last war, and in 1922 joined the staff of Bagshawe & Co. Ltd.,Dunstable, as metallurgist, becoming works manager before leaving in 1933 to establish his own business as consulting engineer.

♦ ♦ ♦

A. J. Klimek, recently foundry superintendent, Albion Malleable Iron Co., Albion, Mich., has been appointed foundry service engineer for United Oil Mfg. Co., Erie, Pa. A native of Quincy, Ill., Mr. Klimek has had a wide experience in the foundry industry. He was formerly foundry superintendent at the plants of Vermilion Malleable Iron Co., Hoopeston, Ill.; Pullman Car & Mfg. Co., Michigan City, Ind.; Warner Malleable Iron Co., Hammond, Ind.; Gunite Foundries Corp., Rockford, Ill., and Erie Malleable Iron Co., Erie, Pa.; and vice president and general superintendent, Terre Haute Malleable Iron Co., Terre Haute, Ind.

♦ ♦ ♦

Robert C. Stanley, chairman and president of International Nickel Co. of Canada Ltd., was awarded the A.S.M. Medal for the Advancement of Research at the annual dinner of the American Society for Metals, Oct. 19, at Cleveland. Mr. Stanley joined Orford Copper Co., Bayonne, N. J., in 1901 and became assistant superintendent of International Nickel Co. which owned these companies, and in 1918 was elected vice president in charge of operations, and moved to the executive offices in New York. He became president of the company in 1922.

♦ ♦ ♦

James W. Crist, formerly foundry superintendent, Lynchburg Foundry Co., Lynchburg, Va., has been appointed assistant to the works manager, assigned to molding and patternmaking problems. He has been with the company since 1901. **Raleigh C. Mays Jr.,** who succeeds Mr. Crist as foundry superintendent, has been with the company since 1934, serving successively as woodpatternmaker, estimator for the engineering department and assistant patternshop foreman.

♦ ♦ ♦

Walter A. Furst, formerly general contract manager for Westinghouse Electric & Mfg. Co. and subsidiaries, has been appointed district representative in the Pittsburgh area for the Storage Battery Division of Philco Corp., Trenton, N. J., with headquarters in the former city. Mr. Furst was graduated from the University of Maryland.

♦ ♦ ♦

William Roedersheimer, associated with Auto Stove Works, New Athens, Ill., for 25 years, has joined Memphis Casting Works, Memphis, Tenn. Mr. Roedersheimer served his apprenticeship at Orbon Stove Co., Belleville, Ill.

♦ ♦ ♦

Lester C. Stork has been named vice president in charge of manufacturing and engineering, Kelley-Koett Mfg. Co.,

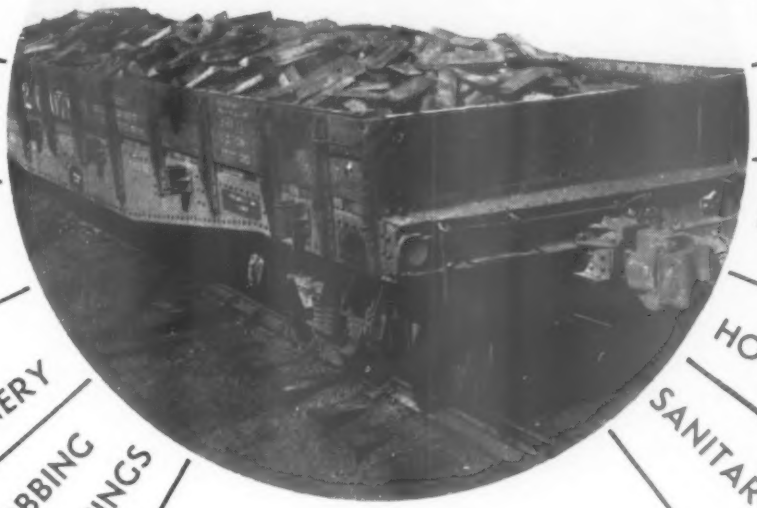
(*Continued on page* 106)

DAVID B. JOSEPH

JOHN W. GARDOM

HARRY E. LADWIG

A. J. KLIMEK



WOODWARD IRON

Ideally adapted to all types of castings where

UNIFORMITY

is essential.

WOODWARD IRON COMPANY

WOODWARD, ALABAMA

Independent Since 1883

GENERAL SALES OFFICES: 1515 First National Building • Birmingham, Alabama • Phone 4-6786

(*Continued from page* 104)
Covington, Ky. Mr. Stork joined the company in 1941 as production manager and later became factory manager. **Clifford E. Kohlhepp,** former controller of the company, has been appointed assistant to the president. **David Sussin,** formerly chief engineer, has been appointed chief of research.

♦ ♦ ♦

Kent R. Van Horn, who was elected president of the American Society for Metals at the recent National Metal Congress, is research metallurgist for the Aluminum Co. of America at Cleveland. He was graduated from Case School of Applied Science in 1926 and received his doctors degree of metallurgy at Yale University. He served as instructor at Yale in metallurgy for 2 years and has been with the Aluminum company in his present capacity since 1929.

♦ ♦ ♦

J. M. Johnson has been appointed general foundry superintendent, National Radiator Co., New Castle, Pa. Mr. Johnson was previously connected with General Steel Castings Corp., Armor Plant, Madison, Ill., and has had a wide experience in the foundry industry. At one time he was employed by Central Foundry Co., Holt, Ala.

♦ ♦ ♦

Fred Grotts has been appointed director of research and metallurgy for all plants of H. K. Porter Co. Inc., Pittsburgh. Mr. Grotts continues as president of the company's subsidiary, Ft. Pitt Steel Casting Co.

♦ ♦ ♦

F. Jerome Tone Jr. has been made vice president in charge of sales, Carborundum Co., Niagara Falls, N. Y., succeeding senior vice president, **Charles Knupfer,** who has been assigned to special sales and activities. Mr. Tone previously was vice president in charge of the eastern sales division of the company and is president of the American Supply and Machinery Manufacturers' Association. **Henry P. Kirchner,** vice president, has been placed in charge of production, and **Otis Hutchins** has been named technical director of the Carborundum Co. in charge of research and process control and development.

♦ ♦ ♦

Lloyd C. Smith has been appointed assistant domestic sales manager, Heller Bros. Co., Newark, N. J. Mr. Smith

LLOYD C. SMITH

joined the organization at the beginning of this year, having previously been in the employ of Nicholson File Co., Providence, R. I.

♦ ♦ ♦

John B. Girdler has been appointed sales manager of the eastern district of Vanadium Corp. of America, New York, with headquarters in that city. Mr. Girdler has been a sales representative of the company for the past 4 years.

♦ ♦ ♦

Ellis L. Spray has been elected vice president and general manager, Westinghouse Electric Elevator Co., following the retirement of **Frank C. Reed** who had been president since 1936. Mr. Spray joined the Westinghouse organization in 1918 and recently had been manager of the company's Merchant Marine Division at Lester, Pa.

♦ ♦ ♦

Leslie J. Woods, since 1942 vice president and general manager of National Union Radio Corp., a subsidiary of Philco Corp., Philadelphia, has been appointed manager of the Industrial Radio Division of the latter, with headquarters in Detroit. **Martin F. Shea** recently in charge of Philco's Washington office, has been appointed assistant manager of the division.

♦ ♦ ♦

Walter H. Ridley has joined the sales promotion department of the Foxboro Co., Foxboro, Mass. For the past 2 years Mr. Ridley has been in the Boston office of WPB. Following his graduation from Massachusetts Institute of Technology in 1928 he was engaged for 14 years in textile mill machinery design and sales work.

♦ ♦ ♦

Norman W. Slohm has been appointed in charge of sales of aluminum to the steel industry for National Smelting Co., with headquarters at its main office in Cleveland. Associated with sales and purchasing in the nonferrous industry for 25 years, Mr. Slohm has been with National for 5 years and recently had charge of its Chicago office.

♦ ♦ ♦

John W. Sands, who has been with the Conservation Division of the War Production Board, Washington, since January, 1942, has resumed his duties with the Development and Research Division, International Nickel Co., New York.

♦ ♦ ♦

John B. Campbell has been appointed deputy vice chairman for production of the War Production Board, Washington. Mr. Campbell also is chairman of the

(*Concluded on page* 108)

KENT R. VanHORN

J. M. JOHNSON

FRED GROTTS

F. J. TONE JR.

THE LAST DROP IS AS GOOD AS THE FIRST

Ask the Men Who Use It!

Let's Talk Turkey:

Why not get down to the real facts about CORE OIL? You want constantly maintained UNIFORMITY in castings. DAYTON OILS give you constantly maintained (for over 20 years) UNIFORM quality. Our oils are laboratory tested all the way through . . . to give you trouble-free performance. Call in the Dayton Oil man . . . let him "talk turkey"—we'll rest our case on results.

The

DAYTON OIL COMPANY

DAYTON • OHIO

STEEL CORE AND MOLD WASHES • BINDER AND CORE PASTE • CORE WASHES • CHILL COATINGS

(*Concluded from page* 103)
National Forge and Foundry Committee. For about 20 years previous to joining WPB he was associated with Fairbanks, Morse & Co., Beloit, Wis., and the Pettibone Mulliken Co., Chicago.

♦ ♦ ♦

Fred G. Teufel, formerly Cleveland district manager of the Storage Battery Division, Philco Corp., has been appointed midwestern sales manager of the division and a member of the management staff at headquarters. Mr. Teufel joined Philco in 1941 after an affiliation of 23 years with Willard Storage Battery Co., Cleveland.

♦ ♦ ♦

Laurence E. Cooney has been appointed vice president and general sales manager of the Austin Co., Cleveland. Mr. Cooney joined the company in 1919 as assistant to the general construction manager and served successively as office manager, district construction superintendent, and district sales manager.

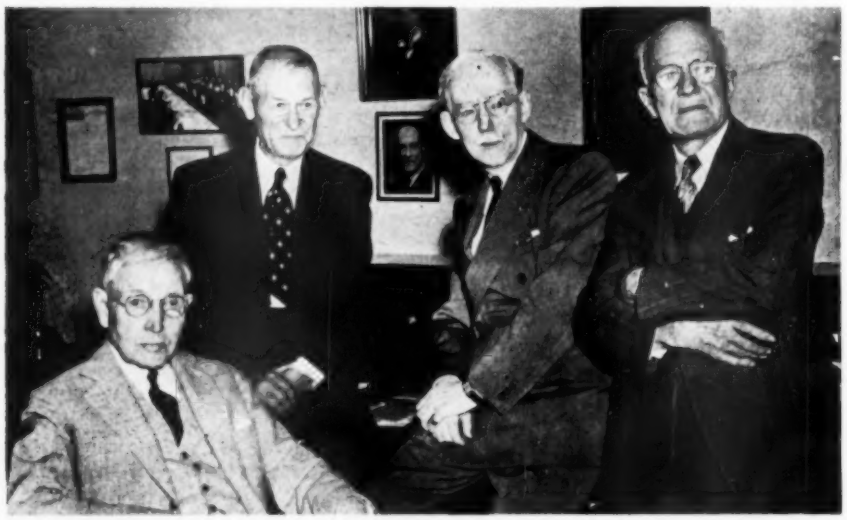
♦ ♦ ♦

William J. Van Vleck has been appointed manager of the Atlanta district office of Worthington Pump & Machinery Corp., Harrison, N. J. Mr. Van Vleck has been with the company for 20 years, the past 6 years as assistant manager of the Philadelphia district office.

♦ ♦ ♦

William B. Mercer, since 1942 chief in charge of the Conveyor and Mechanical Power Transmission Equipment Section, Material Handling Division, War Production Board, has returned to Robins Conveyors Inc., Passaic, N. J. He has been assigned to the Boston office of the company where he will share the New England territory with **J. F. Donahue** in charge of Mead-Morrison Division sales.

TRIPLE FURLOUGH: A. J. Heysel Sr., Buffalo branch manager of E. J. Woodison Co., recently had the unexpected treat of having his three sons, all in service and located in different camps, be granted furloughs at the same time. The three Heysel brothers had been connected with Bison Casting Inc., Buffalo, before entering the service. Shown seated are Pfc. Donald W., left who is with a medical battalion, and Pvt. Joel, an infantryman. Standing are Avitus J. Jr., boilermaker second class, left and the trio's father



NACO SERVICE SOCIETY: More than 1000 veteran employes of National Malleable & Steel Castings Co. have become members of the newly-formed Naco Service Society, an honorary organization to which employes with service records of 15 years or more are eligible. The society was launched in Cleveland Sept. 27, and chapters also have been organized to represent employes at company plants in Chicago, Indianapolis, Melrose Park, Ill., and Sharon, Pa. Shown, left to right, at the Cleveland organization banquet are: Henry F. Pope, chairman of the board; Joseph Stedronsky, landscape superintendent; LeRoy Gould, assistant controller, and Raymond E. Miller, manager of the order department. Headed by Mr. Pope with 60 years service, the combined service record of the group is 222 years

♦ ♦ ♦

J. O. Almen, head of mechanical department No. 1, General Motors Research Laboratories, Detroit, has been awarded the Manly Memorial Medal by the Society of Automotive Engineers based upon his technical paper, "Shot Blasting to Increase Fatigue Resistance," presented in June 1943 before the SAE War Material Meeting at Detroit.

♦ ♦ ♦

James L. Dunn, associated with Jenkins Bros., Bridgeport, Conn., since 1913, has been elected vice president in charge of industrial relations. Mr. Dunn entered the company as a clerk, and subsequently held the positions of production manager, business manager, and until Sept. 14, assistant plant manager.

♦ ♦ ♦

K. M. Hamilton, who has been associated with Steel Castings Section, Forgings and Castings Branch, WPB, since March 1942, has resigned. Mr. Hamilton has returned to Chicago and plans to open an office representing a large steel casting company in the near future.

♦ ♦ ♦

Clyde B. Faverty, formerly manager of the car shops, Bethlehem Steel Co., Johnstown, Pa., has joined Pullman-Standard Car Mfg. Co., Chicago, as assistant to the manager of freight plants in charge of plant and foundry improvements.

♦ ♦ ♦

C. Leslie Jamison has been appointed vice president in charge of sales for the Strauss Co. Division of Portable Lamp & Equipment Co., Pittsburgh, with headquarters in the former offices of the Strauss Co., 925 Liberty avenue, Pitts-

♦ ♦ ♦

Montague A. Clark, until recently director of the War Manpower Commission for the state of Michigan, has joined the Management Engineering Division of the Labor Relations Institute, with headquarters in Detroit.

♦ ♦ ♦

Gordon Lefebvre, president of Cooper-Bessemer Corp., Mt. Vernon, O., and Grove City, Pa., has been elected to the executive committee of Machinery & Allied Products Institute.

♦ ♦ ♦

Royal G. Parks, formerly of the accounting firm of Arthur Andersen & Co., has been elected controller, National Malleable & Steel Castings Co., Cleveland.

♦ ♦ ♦

Arthur L. Grede, vice president, Grede Foundries Inc., Milwaukee, has been named chairman of the Interracial Relations Committee of that city.

You Can Easily Solve Your Hard-to-Reach-Grinding Problems With STERMOUNTS

STERLING'S New Stermount Wheels and Points are designed to help you move small, intricate jobs through your plant faster and at lower cost. There is no limit to their usefulness . . . there is a size and shape for almost any difficult task you have to do. In fact, Stermounts will do work which would be impossible with other types of grinding units.

You can readily grind unusual, out-of-the-way recesses in castings—can sharpen unusual shaped edges of chisels—high speed tools can easily be touched up—gears can be nicked without loss of time. Stermounts have literally thousands of uses . . . there seems to be no limitation to their shop applications.

There are many shapes and sizes . . . only a few of them are illustrated. Their range of usefulness is greatly widened by the fact that they are available in either resinoid or vitrified bonds. Important, too, are the economical, detachable spindles which permit you to reorder only the wheel or point needed . . . you use the spindle over and over again!

May we tell you more about Stermount Wheels and Points? Your letter will bring a Sterling engineer with full information.

The full range of Stermount Wheels and Points is illustrated and priced in this three-colored folder. Send for it today.

• STERLING ABRASIVES •

THE STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY

DETROIT IS NAMED SITE

Of 1945 A.F.A. Convention

THE 1945 annual meeting of the American Foundrymen's Association will be held in Detroit during the week of April 30 to May 4, and probably will consist of a 4-day technical meeting, the A.F.A. has announced.

A strong program covering technical and practical phases of gray iron, malleable, steel and nonferrous metals, and of pattern making is being planned for this 49th annual meeting of the association. It is expected that a number of excellent papers on research and practical developments, some of them arising directly out of war production work, will be forthcoming from the engineering and research departments of the big motor car companies. Several have already been promised, dealing with especially interesting phases of cast metals production.

It is household knowledge that the Detroit auto makers—companies such as General Motors, Ford, and Chrysler—have done a tremendous job in war production through maximum use of their engineering facilities. There are many instances, some of them hitherto military secrets, which should prove of interest to every man connected with the foundry industry. Military censorship permitting, it is hoped that some of the most important improvements in cast metals production can be disclosed at the 1945 foundry congress.

Those who attended the last meeting that A.F.A. held in Detroit, in 1936, will recall that the Motor City offers great possibilities for plant visitations. The selection of Detroit for next year's foundry conference was made partially with the thought that some of the most interesting plants might again be available for the inspection of visiting foundrymen. For example, if Willow Run were opened to visitors, that one plant alone would prove tremendously popular and worth the time of any industrial man.

A.F.A. selected Detroit following an invitation by the officers and directors of the Detroit Chapter of the association, of which R. G. McElwee, Vanadium Corp. of America, is chairman, E. C. Hoenicke, Eaton Mfg. Co., is vice-chairman, A. H. Allen, THE FOUNDRY, is secretary, and W. W. Bowring, Frederic B. Stevens Inc., is treasurer.

Officers Elected By Magnesium Group

Edward S. Christiansen, vice president, Apex Smelting Co., Chicago, was re-elected president of the Magnesium Association at its first annual meeting, held in New York, Oct. 3-4. C. C. Loomis, president, New England Lime Co., Canaan, Conn., was again elected vise president; Clayton E. Larson, operations manager, White Metal Rolling & Stamping Co., Brooklyn, N. Y., treasurer, and Perry D. Helser, New York, secretary. New directors are: Wiser Brown, American Magnesium Corp., Cleveland; Leo Grant, Dow Chemical Co., Midland, Mich.; Jack Barrington, Dominion Magnesium Ltd., Toronto; D. A. Rhoades, Permanente Metals Corp., Oakland, Calif.; Irving T. Bennett, Revere Copper & Brass Inc., New York; and H. E. Sheppard, Rupert Die Casting Co., Kansas City, Mo.

Re-elected to the board of directors were: W. H. Osborne, Acme Aluminum Foundry Co., Chicago; E. S. Christiansen; C. A. Brantingham, Ebaloy Foundries Inc., Rockford, Ill.; Anthony Cristello, Eclipse Pioneer Division of Bendix Aviation Corp., Teterboro, N. J.; R. D. Taylor, Federated Metals Division of American Smelting & Refining Co., New York; D. W. Moll, Hills-McCanna Co., Chicago; D. A. Merson, Magnesium Reduction Co., New York; P. J. Watry, Metal Mold Magnesium Corp., Cedarburg, Wis.; C. C. Loomis; F. S. Wellman, Wellman Bronze & Aluminum Co., Cleveland; and C. E. Larson.

Hamilton "E" Award Is Renewed

Hamilton Foundry & Machine Co., Hamilton, O., has been granted a second renewal of the Army-Navy "E" Award "for meritorious service on the production front." The Hamilton company, the first gray iron foundry in history to receive this award, was given its original "E" notification on Aug. 26, 1943, and the award was renewed 6 months later. The second renewal came at an appropriate time, since the company marked completion of its fifty-third year on Sept. 11.

National Founders Meet Nov. 16-17

National Founders Association will hold its annual meeting at the Stevens Hotel, Chicago, Nov. 16-17. This will be the first time in many years that the annual gathering has been held in Chicago. The meeting schedule calls for business sessions on both mornings and a meeting of the new administrative council the afternoon of Nov. 17. J. M. Taylor, 120 South La Salle street, Chicago, is secretary-treasurer of the organization.

Opens Branch Office

J. O. Ross Engineering Corp., New York, has opened a new branch office at 79 Milk street, Boston 9. The Boston office is to be in charge of Frank W. Partsch, vice president.

Officers of Detroit Chapter, A.F.A., Convention Hosts in 1945

R. G. McELWEE

E. C. HOENICKE

A. H. ALLEN

W. W. BOWRING

SAVE TIME { THESE 3 WAYS }

"Get better castings, too—"

1 GET FASTER FORMING!

Truline cores ram quickly, giving dense cores with freedom from sagging. *This means more cores per hour per core maker!*

2 GET FASTER BAKING!

Truline cores harden under low oven heat, dry without oxidation. Oven-time is less, output greater!

3 GET FASTER CLEANING!

Truline cores burn out readily. Core sand shakes out easily, saving valuable clean-up time.

NOWADAYS the problem is speed—and more speed. Usually with incompletely trained personnel. What's more, most war work is in castings of high-shrinkage metals.

Many foundries are finding the answer to these production problems in Truline Binder. To begin with, Truline is faster all along the line. (See 1, 2, and 3.) But even more important, Truline-bonded cores collapse quickly, thus eliminating the danger of "hot-tears." For further information about Truline, write Hercules. Use the coupon at the right. No obligation.

TRULINE BINDER

Reg. U. S. Pat. Off.

HERCULES POWDER COMPANY
INCORPORATED
999 Market St., Wilmington 99, Delaware

Please send ☐ sample ☐ information on how to use Truline Binder in casting:

(state type of work and kind of metal cast)

Name _____ Title _____

Company _____ City _____ State _____

Address _____ NB-43

Electric Steel Foundrymen

Consider Closer Control

By EDWIN BREMER
Metal'urgical Editor
THE FOUNDRY

WITH an attendance of 540, an increase of 25 per cent over last year, the second annual Electric Furnace Steel Conference was held in the William Penn hotel, Pittsburgh, Oct. 5 and 6. Sponsored by the Electric Furnace Steel Committee of the Iron and Steel Division, American Institute of Mining and Metallurgical Engineers, the conference was under the direction of Charles W. Briggs, Steel Founders' Society of America, and Harry McQuaid, Republic Steel Corp., both of Cleveland.

First day's meetings were joint discussions relating to acid and basic practice, with the annual banquet held in the evening. Charles M. White, Republic Steel Corp., serving as toastmaster, paid tribute to the group and the excellent job they have accomplished. However, Mr. White said, he believed that the electric furnace steel industry still had much to look forward to since it has not reached its ultimate. Second day's sessions, held simultaneously, were devoted to acid and basic practices. Announcement was made that next year's conference will be held at Hotel Statler, Cleveland, Dec. 4 and 5, 1945.

Opening session held Thursday morning, Oct. 5, was devoted to performance and maintenance of equipment for electric arc furnaces. Glen E. Stoltz, Westinghouse Electric & Mfg. Co., was chairman and N. F. Stansel, General Electric Co., was co-chairman. First paper on "Problems in Effective Use of Power in Production of Electric-furnace Steel" was presented by L. W. Long, Allis-Chalmers Mfg. Co., and pointed out the necessity of regular inspection to see that equipment is maintained in first-class condition. A. McQueen, Atlas Steels Ltd., Welland, Ont., in discussing maintenance of equipment to minimize delays, stated that the problem might be divided into three categories, namely prevention of wear, proper lubrication, and use of safety devices. By proper routine inspection, repairs can be kept under control, and by properly programming repair jobs, difficulties in making them can be held to a minimum. He also said that welded joints on crane runways eliminated trouble.

Andrew Kaul III, International Graphite & Electrode Corp., St. Marys, Pa., discussed handling and proper use of electrodes and pointed out that unloading electrodes from cars should be performed carefully, and steel hooks never should be used on packages. With individual electrodes, they may be rolled on planks to keep them out of the dirt. Electrodes should be stored in a warm, dry place on steel racks preferably near the furnace. They should be stored in the horizontal position and never on end. Since the joint between electrodes is a point of mechanical weakness, considerable care should be taken in making it. In use the electrode should be parallel to the masthead, and the cross heads should be tight. The furnace should be charged properly to prevent electrode breakage, and some light, clean scrap on the top of the charge will give good arc contact. Charges should be as compact and dense as possible. Since hot electrodes oxidize easily in the air, they should be kept in the furnace as much as possible.

CHARLES W. BRIGGS
Chairman, Electric Furnace Steel Conference Committee

W. B. Ferguson, Carnegie-Illinois Steel Corp., stated that if engineering departments would consider the problems of the operating and maintenance departments on production and service, little trouble would be encountered. He also advocated installation of handling equipment for heavy parts in the vaults containing transformers, regulating and other electric furnace auxiliaries. He said that he had found counterweights on furnace doors as well as on electrode hoists gave better results than other methods. Mr. Ferguson also pointed out that relays should be installed on the back rather than on the front of furnace panels so that they could be kept clean and serviced without interfering with the furnace operator.

In the discussion L. H. Fister, Bethlehem Steel Co., said that at his plant the maintenance program was based on class of service to be rendered, safety factors and quality of the product, duty cycle imposed on equipment, and local conditions of atmosphere, temperature, etc. By detailed inspection of the main arc circuit breakers he said that few delays were encountered due to breaker troubles. C. H. Emerson, Rustless Iron & Steel Corp., mentioned that oil circuit breakers on furnaces often were set for higher ratings than prescribed by the manufacturer to eliminate trouble from too frequent breaking of the circuit during furnace operation. As to the power factor on furnaces, he believed that operators are not familiar with it, and prefer the use of indicating wattmeters for control. H. J. Miller, American Rolling Mill Co., said that in his plant close cooperation between maintenance men and furnace operators kept delays and interruptions at a minimum. He also pointed out that careful inspection for loose connections, broken insulators, maintenance of clean contacts, and removal of dust and dirt on connections, switches, motors, etc., were necessary to keep furnaces in operation.

Afternoon session on Thursday, Oct. 5 was devoted to refractories with J. E. Arthur, Crucible Steel Co. of America, and R. B. Heuer, General Refractories Co., as chairman and co-chairman respectively. H. M. Parkhurst, General Refractories Co., pointed out that while there has not been much change in refractory materials, there have been some refinements. Brick should be handled carefully to avoid broken corners and edges, and drums containing moist cements should be kept sealed. Plenty of storage space which should be kept dry and clean, should be provided. Expansion joints in silica roofs vary from plant to plant so that there is no standard. However, the allowance should be adequate, but not too much. Wood fires for drying out refractories are not recommended due to non-uniform heat delivered. Gas fires are preferable.

Ed Chelius, Carnegie-Illinois Steel Corp., said that practice of many refractory manufacturers of shipping brick on pallets made handling an easy matter whether into storage or to the job. Ray McCurdy, Republic Steel Corp., stated that at his plant the brick were unloaded from cars into iron boxes which then were stored or taken to the job. Alex C. Texter, Atlas Steel Ltd., pointed out that for best results brick should be kept dry, and said that practice in his plant is to build roofs on a form, and then dry on a steam heated table.

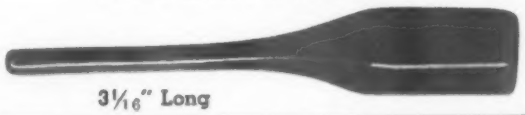
E. K. Pryor, Charles Taylor Sons Co., in discussing roof design and maintenance mentioned that there has been no fundamental change in either. Silica brick for roofs have the advantage of

(*Continued on page* 173)

KOOLHEAD FOUNDRY CHILL NAILS

HOT FORGED — COLD FINISHED

GIANT HEAVYWEIGHT HEAD



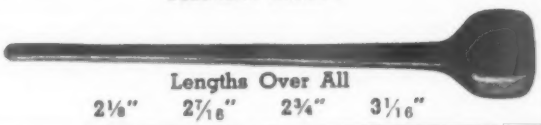
3 1/16" Long

SLIM BLADE

Lengths Over All

1 1/16" 2 1/8" 2 7/16" 2 3/4" 3 1/16"

MEDIUM BLADE



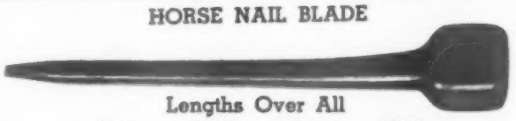
Lengths Over All

2 1/8" 2 7/16" 2 3/4" 3 1/16"

JUMBO PATTERN

3 1/16" Long

HORSE NAIL BLADE



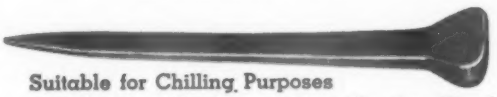
Lengths Over All

2 1/8" 2 3/8" 2 5/8" 2 7/8"

LOK - SAND
OR "SCAB" NAIL
Straight or Bent
to Any Angle

3 1/16" Long

HORSE NAIL SECONDS



Suitable for Chilling Purposes
But Not For Shoeing — Sizes No. 5 to No. 11

HORSE NAIL STUBS

Made in Lengths

1" 1½" 2"

FOR OVER 72 YEARS

ESTABLISHED 1872 — STANDARDS FOR FORGED — INCORPORATED 1886

MANUFACTURERS OF
HOT-FORGED COLD-FINISHED
HORSE SHOE NAILS

•

"KOOLHEAD"

IS THE TRADE NAME OF "STANDARDS"

CHILL NAILS

CLEAN — BRIGHT FINISH — A TYPE
FOR EVERY PURPOSE

•

Other "Standard" Products

- DOWEL PINS
- TAPER PINS
- COTTER PINS
- WOODRUFF KEYS
- MACHINE KEYS
- MACHINE RACK

—AND OTHER STEEL SPECIALTIES.

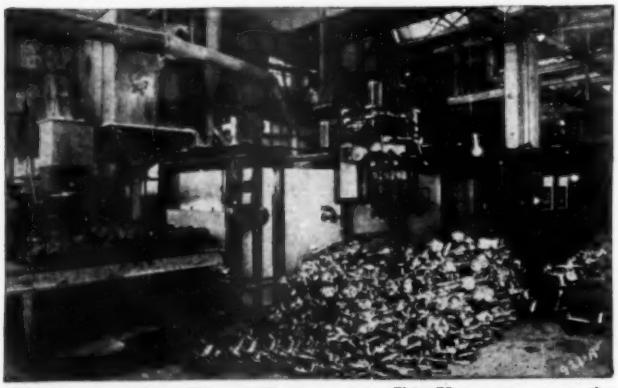
STANDARD HORSE NAIL CORP.

NEW BRIGHTON, PENNA.

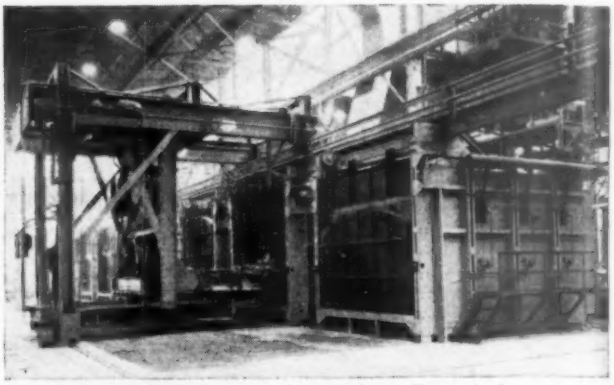
EF FURNACES

For Every Industrial Heat Treating Process

Some EF Electric and Fuel Fired Production Furnaces for Annealing and Heat Treating Castings

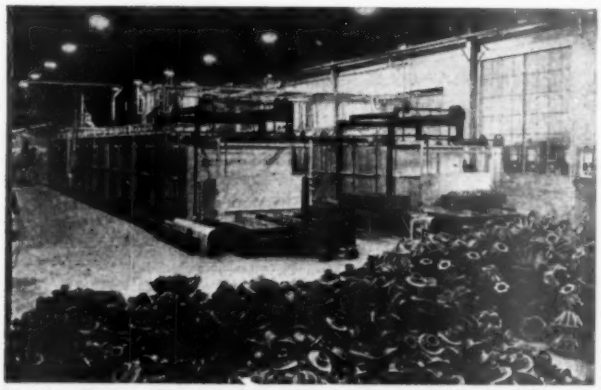


Recuperative Type Furnaces. This EF return recuperative type anneals castings uniformly and continuously. The heat from the outgoing castings preheats the incoming castings—saves fuel.

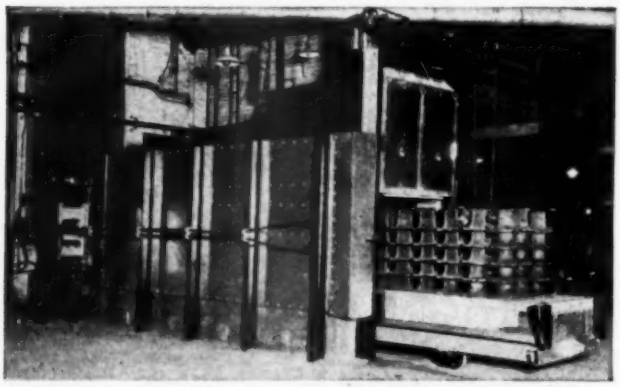


Heat Treating Large Castings. Heavy tank armor castings, railroad castings and other large parts and products are heated and quenched in EF units similar to above.

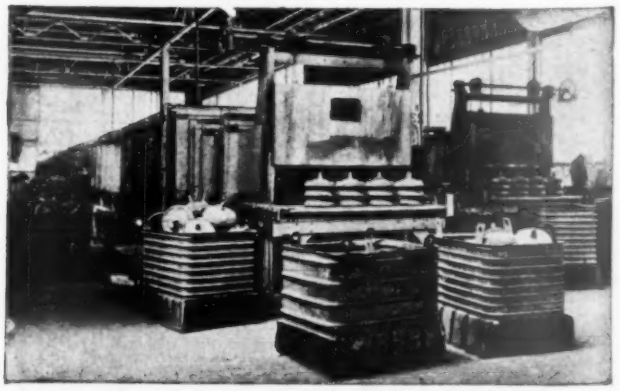
Car Bottom Furnaces. EF car type furnaces are built in any size, with single chambers, multiple chambers with cross transfer car, or with quenching means as required.



Scale Free Annealing Castings. 40,000 lbs. of castings per day are annealed absolutely scale-free in the above EF continuous special atmosphere short cycle annealing installation.



Magnesium & Aluminum Castings are uniformly treated in various designs of EF electric and fuel-fired pit type, car type and other batch and continuous type furnaces.



Annealing Large Castings—Continuously. Two EF oil fired furnaces annealing large alloy castings uniformly and continuously. The castings are carried through on roller hearths.

Additional data on these and other types of EF Production Furnaces sent on request.

The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces---For Any Process, Product or Production

around DETROIT

BY A. H. ALLEN
Detroit Editor, The Foundry

Executives and educational leaders plan program to "sell" young men on careers in foundry industry. . . . Foundries still have much to do to attract capable workmen, supervisory and operating officials

ALTHOUGH many foundry operators are convinced the current hullabaloo over the shortage of manpower in castings plants is considerably over-rated, they will agree to a man on what is a basic deficiency of the foundry industry—lack of a definite and concerted effort to "sell" young men on careers in this field. The two problems are somewhat related but the latter is of far greater significance over the long pull, and the beginnings of some concrete planning to correct the trouble are evident in the Detroit area.

Under the stimulus of Fred J. Walls, International Nickel Co. Inc., national vice president of the American Foundrymen's Association, a group of foundry executives and educational leaders has been organized in a tentative way, with a program devised to have as its initial goal a full exposition of the problem and its correctives to top management. Once this has been achieved, the co-operation of community and educational leaders will be enlisted, and finally the joint effort made to "merchandise" foundry work to young men, principally at the high school level.

Gives Primary Causes

In outlining a broad attack on the problem Mr. Walls and his group have first examined the causes for waning interest in foundry work, and then have attempted to suggest plausible cures. There are four primary causes which are discernible:

1. The public's lack of understanding of what modern foundry practice is, the importance of foundry products to society, misconceptions of foundry work as a livelihood and the opportunities it provides for interesting and successful careers.

2. Undesirable conditions existing within the foundry which tend to make the work unattractive but which might easily be corrected.

3. Highly mechanized operations which do not promote exercise of skill and pride of accomplishment.

4. Rates of pay which in relation to those received in other branches of industry requiring the same and even less skill do not compensate for certain aspects of the work.

Now these may bear some further examination. As far as No. 1 is concerned, the foundry industry is not too different from any other basic industry. The public as such knows only a smattering of actual operations and equipment involved. Institutional advertising programs have done some good in explaining importance of various end products to society—steel, for example, also brick, cement, lumber, etc. As far as job opportunities, it must be remembered that foundry employment rolls today are at the war-swollen level of an estimated 600,000 or better. In 1939-40, a survey conducted by THE FOUNDRY showed the employment level to be around 325,000, while in a recent booklet, "Jobs in the Foundry," by Ernest L. Bowman of the War Manpower Commission it is stated normal foundry employment probably runs around 175,000.

What Are the Chances?

The young man examining prospects of the foundry industry might well ask at this stage: Well, what chance is there for me in an industry which may have to contract from present employment of 600,000 to a stated normal of 175,000? The answer is not readily forthcoming, and the further observation is indicated that perhaps some of the worry over the future is not justified when it is weighed against the probable postwar contraction of the industry.

As far as mechanized operations are concerned, it appears foundrymen must recognize the trend which scores of other industries have followed; that is, transferring the skill of the individual operator to the machine, relieving the operator of drudgery and manual toil and permitting the payment of higher wages by virtue of increased output per man-hour. It is futile to combat this trend in foundries, for it is coming at an accelerated pace just as sure as Victory. Even now equipment interests in their travels among foundries report a universal desire for machines and devices which "need only a pushbutton" to actuate. This desire obviously is heightened by the low grade of labor available in many areas, but is it reasonable to assume that once higher grade labor becomes available, the pushbutton machines will be torn out and replaced by the old jobs requiring manual dexterity and special skill?

In the machines which are steadily "automatizing" foundry operations, just as they have done virtually 100 per cent in the modern strip-sheet steel continuous rolling mill perhaps lies the hope for an entirely new atmosphere and set of working conditions in foundries, not to mention higher rates of pay.

Certainly this has been proved in the large automotive foundries which carry out repetitive work and must shave costs close to the bone. In fact, they have been the driving force behind much of the foundry mechanization which has been achieved in the past 25 years. In the jobbing foundry the story is somewhat different, but there would appear no reason why the engineering skill of machine designers and plant engineers will not accomplish the same thing here, given sufficient time and enough pressure behind them.

Well, what can be done by foundries to attract capable workmen, supervisory and operating officials and finally the executive management of tomorrow? One step is in the field of public relations which might include the following: Talks by foundry executives before various community groups; news articles relating to foundry work; radio presentations; moving pictures; literature for general distribution telling what castings are, the interesting processes by which they are made and their vital importance to everyone; and trips through foundries so the public can see what goes on.

Need Co-operative Effort

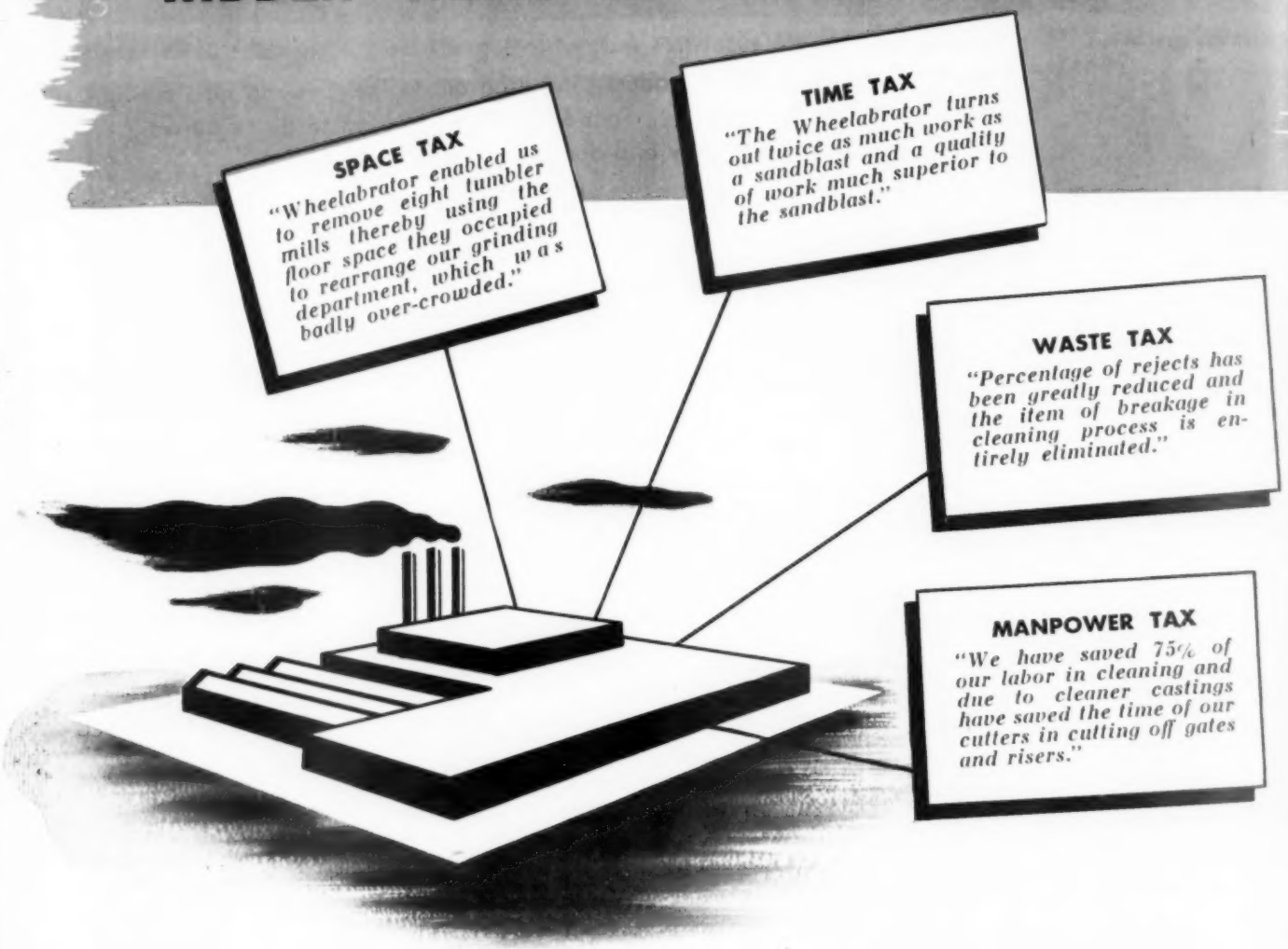
In getting its story across to young prospective foundrymen, the industry might lend its support to arranging for inclusion of foundry practice in the manual training curricula of public schools and in trade schools; also to the encouragement of foundry practice as a hobby for Boy Scout and other youth groups.

Much, of course, remains to be done inside the foundry itself, as previously suggested. Possibly heading the list is the indoctrination of foundry executives and supervisory staffs with the need for a greater emphasis upon human relations, and provisions for recognizing the individual workman regardless of his position of future prospects for pro-

(*Concluded on Page* 118)

Wheelabrator

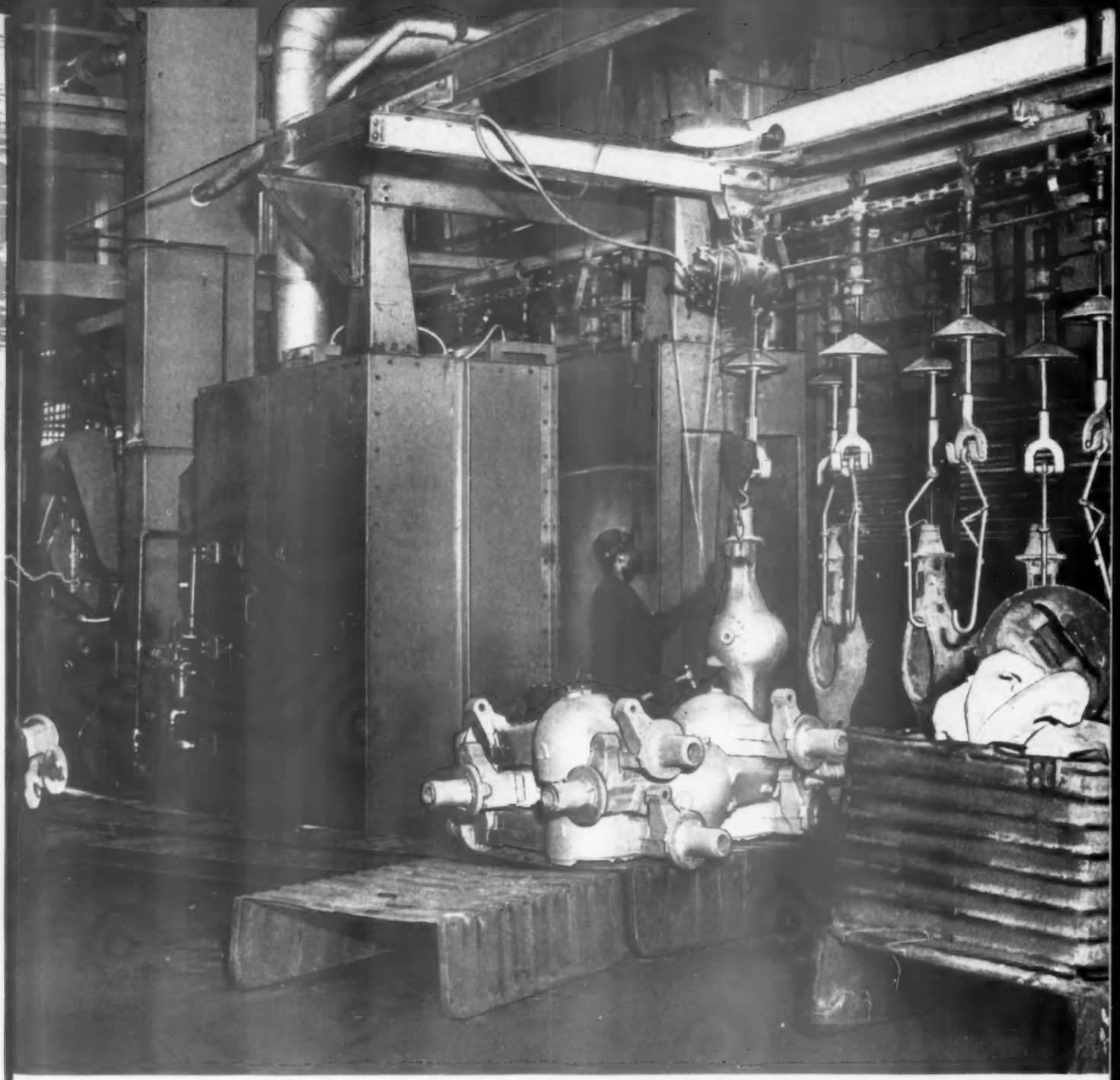
ELIMINATES THESE HIDDEN TAXES IN METAL CLEANING


SPACE TAX
"Wheelabrator enabled us to remove eight tumbler mills thereby using the floor space they occupied to rearrange our grinding department, which was badly over-crowded."
TIME TAX
"The Wheelabrator turns out twice as much work as a sandblast and a quality of work much superior to the sandblast."
WASTE TAX
"Percentage of rejects has been greatly reduced and the item of breakage in cleaning process is entirely eliminated."
MANPOWER TAX
"We have saved 75% of our labor in cleaning and due to cleaner castings have saved the time of our cutters in cutting off gates and risers."

CERTAIN present day taxes are inescapable—we all know that wars cannot be fought and won without them. But others, particularly the taxes wrought by inefficiency, are largely inexcusable because modern equipment, if wisely selected, will usually pay for itself many times over. The airless Wheelabrator does just that in the cleaning and finishing of castings . . . and, in addition, it eliminates many other "taxes" encountered in foundry cleaning operations.

The comments of a few users, printed above, are indicative of why more than 2,000 plants have modernized with Wheelabrator equipment. Our engineering staff is ready to help you eliminate the hidden taxes on your cleaning problem. Send for complete information today.

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT



A thoroughly cleaned rear axle housing every minute is the production record of this Wheelabrator Monorail Cabinet at a large Ohio jobbing foundry. Sand and scale from all surfaces, including many intricate crevices and openings, are completely removed in the effective abrasive blast coverage of four Wheelabrator units.

Customers of this foundry report drastic reductions in machining and tool costs, because the Wheelabrated castings now supplied them are perfectly clean.

ARMY (E) NAVY

THE AMERICAN MOLDER
TRADE MARK REG. U. S. PAT. OFF.

American

FOUNDRY EQUIPMENT CO.

505 S. BYRKIT ST. MISHAWAKA, IND.

(*Concluded from page* 115)

motion as a "person", on the basis of his sincerity and contributions to his job. Human relations, or Humanics, as Ralph Lee calls them, lie in a field which all industry has been negligent in cultivating, perhaps because it has been too busy in respect to technical progress and production.

Improvement of working conditions, including good housekeeping, lighting, ventilation, dust collection, washrooms, locker rooms, dining rooms, cafeterias, etc., are matters which foundries have given too scant consideration, which may be one reason why the aforementioned Mr. Bowman describes foundry work in his booklet as follows:

"There's no white-collar work in the foundry—except for a few. Your overalls will get greasy, your face dirty, your hands grimy and as hard as leather. A lot of work is backbreaking, even dangerous. You need to have plenty of muscle where it counts the most—in your legs, back and arms. You need to have plenty of nerve when the going gets tough. You usually have to stay on your feet all day long—and you have to be strong enough to stand the strain.

"You need to have good eyesight. There's plenty of steam and dust in the foundry, and you can't stop every minute to wipe off your glasses. Besides, you often have to wear goggles. . . . In spite of the dust collectors a foundry may use and in spite of the respirator masks the workers wear, there's still plenty of dust. It's in the air, on the molding floor, in the finishing or cleaning room, near the tumbling barrels and sandblasting equipment.

"You breathe in a lot of dust in a foundry. Your lungs have to be strong enough to stand it. The same holds true for other parts of your breathing apparatus—nose and bronchial tubes."

Please, Mr. Bowman, you're killing us!

But to go on with some other in-plant correctives, there is the study and adjustment, if necessary, of rates of pay in relation to those offered in other departments of industry. There is the preparation of specially tailored training courses for foundry executives and supervisors designed to improve their ability to instruct and direct their workmen and to develop a mutually satisfactory personal relationship. There is the preparation of presentations for the rank and file employe aimed to show him the importance of his contribution to industry, the significance of what he does and to acquaint him with the opportunities the foundry industry provides for work satisfaction and advancement. And finally there is the provision of off-the-job educational opportunities for all departments of foundry practice, including metallurgy and other technical subjects. In this category might be included company-paid memberships in technical societies and "recommended" attendance of regular technical meetings held by these groups.

Not to end on a sour note, but in the attempt to be realistic about the future, it is this observer's opinion that public relations efforts in behalf of foundries will meet the minimum of results; that the industry is a sure bet for future greater mechanization all the way from patternmaking to blast cleaning; that the day of the skilled molder, coremaker and patternmaker, with training handed down from grandfather to father to son, is nearly done; that the coming postwar contraction in foundry operations will relieve present problems in respect to both high-grade labor and supervision.

AUTO DEALER TURNS FOUNDRYMAN: M. C. Holter and an employe of Pullman Northwest Inc., Pullman, Wash., subsidiary of Brown & Holter Chevrolet Co., check shipment of strainers manufactured for U. S. naval craft. Although continuing its automotive servicing work, the company through its subsidiary now operates a pattern shop, bronze foundry and machine shop. Employes, drawn from various types of civilian activity, were trained on the job

Book Review

Cast Metals Handbook, cloth, 745 pages, 6 x 9 inches, published by the American Foundrymen's Association, Chicago. Price $5.

The new, third edition of an authoritative reference book dealing exclusively with the engineering properties of cast metals has been completely revised to include all the developments which have occurred since the previous publication in 1940. To give some idea of the changes it might be pointed out that the new book contains 40 per cent more pages, 46 per cent more illustrations, and the number of tables have increased 20 per cent. Greatest increases are in the sections devoted to steel, gray cast iron, and nonferrous metals and alloys.

While written primarily for the engineer, designer, and buyer of castings, every foundryman should have a copy at his elbow so that he may become more conversant with the possibilities and properties of the product he is making. In addition to authoritative information on engineering properties each section contains the latest data on standard and tentative standard specifications promulgated by the government and other bodies.

To indicate some of the changes which enhance the value of the book it may be pointed out that in the cast steel section the material relating to recommendations to designers of steel castings has been rewritten entirely, and covered in great detail. That section also contains material on nondestructive tests which was not in the previous edition. In the section on gray iron various phases such as the metallurgy, physical properties, heat treatment, etc. have been rewritten to bring them up-to-date. Specification data has been extended to include British and Canadian standards. In the section on nonferrous alloys new material includes description of molding methods, an extensive table showing casting use and composition, data on the newer aluminum alloys, to mention but a few.

Industrial Film Is Available

Norton Co., Worcester 6, Mass., has available for use by apprentice classes, technical societies and similar groups the latest addition to its industrial training films, on the subject of "Grinding Carbide Tools." The 16 mm sound film is available upon application to the publicity department of the company.

PHILCO IS READY TO REDUCE YOUR POST-WAR BATTERY COSTS

THE NEW "PHILCO THIRTY" *Gives 30% Longer Life*

Storage battery purchases made from now on, are essentially a post-war investment. So be sure to keep posted on this sensational post-war Philco Battery development—the new Philco Thirty that gives 30% longer life! Here, at last, is a really revolutionary new long-life construction—employing a brand new principle of FABRICATED INSULATION!* It's available now in certain types and limited quantities. And as rapidly as war time restrictions are eased, Philco will make it possible for every user of electric industrial trucks to share in the new economy and more efficient operation of this great new battery. Write today for information. **Patent Applied for*

PHILCO CORPORATION, STORAGE BATTERY DIVISION
TRENTON 7, NEW JERSEY

Specify

PHILCO INDUSTRIAL TRUCK BATTERIES

FOR 50 YEARS A LEADER IN INDUSTRIAL STORAGE BATTERY DEVELOPMENT

The adventures of BILL

BY PAT DWYER

Drawings By RICHEY

WARM and snug the other night, I sat in an exceptionally comfortable chair situated just the proper distance from an open fire and browsed leisurely through the late Mr. Poe's chilly and melancholy story, *The Fall of The House of Usher.* The story was fairly familiar. I had read it several times under varying conditions and circumstances, and therefore on this occasion was not thrilled, and horrified and goose pimpled as I had been during the first reading.

Sitting in the hayloft of a barn, I had just finished rooting around in a jumbled mass of old books that had seen better days. The temperature was down to about the freezing point and a bitter cold rain was slashing against the roof and walls and dripping through at least 47 cracks in the shingles. I was wet and cold and miserable by the time I finished reading the story. If I did that now—of course I have no intention of doing it—but if I were to try the experiment in this present year of grace, the best I could hope for would be a three-line notice in the paper under the head *Obituaries.*

Bill came in while I was still in a reflective mood. To my modest comment that I must have been an exceptionally hardy, healthy and tough young specimen of humanity, he said he did not doubt that I was tough enough—using the word in the popular sense—but if he was in my place he would go easy on the hardy and healthy stuff. For the past three years thousands of boys have been drenched and frozen by land and sea in the North Atlantic and Pacific, in the Aleutians and in Iceland, and they come back covered with whiskers and with their belt buckles moved over three holes to the left. In his well-considered opinion, a drip in a hayloft, sitting under a drip, did not exactly deserve a distinguished service medal, with or without stars or a cluster of oak leaves.

"You say," he said, "you read the story when you were a young lad, and yet here you are reading it again. Either it is a most remarkable story, or your memory is neither healthy nor hardy. Once over should be enough for any story. In fact if you want my pure and undiluted opinion, once over is once too many times for the majority of 'em."

He leaned over and spelled out the title "The Fall of the House of Usher, hey? Who is this Usher? The bird in the house that fell down? Why did it fall down? Didn't he have it gaggered properly? Is it by any chance related or connected to the well known little Irish house The Tumble Down Shack in Athlone? Anything there about a wee trundle bed or a long lane of white cobble stone? I knew a fella one time could sing that, when he was about half lit, in a manner to bring tears to your eyes."

"I knew a fellow one time," I said, "who could ask enough silly questions in one long breath to bring tears to the eyes of a graven image."

"Ain't it the truth? Especially when the aforesaid graven image does not know the answers. Your reference to your miserable experience in a cold and wet hayloft brings to mind another rainy day, or rather rainy night, story dredged out of the past some time back when I had a bit of a night session with some lads from a plant where I had tarried for some time years ago and where I had toiled diligently by day and sometimes by night.

"The chief clerk in the employment office, a 50-50 combination of sycophant and bully, and therefore cordially detested by one and all, notified the foundry office that he had an applicant or candidate for the position of assistant foundry carpenter. The man had filled in the form for those seeking employment in an apparently satisfactory manner. He had no criminal record, was mild and well mannered and his conversation indicated that he had a proper respect for his superiors, meaning any person in authority. Would the gaffer kindly come down to the office and interview the candidate? The gaffer could and did.

"He found a Cockney with a mild stutter, a pair of bright China blue eyes, a straggly moustache and as full of gab as a magpie. Replying to a question regarding the type of work he had been engaged in h'over 'ome, he said he had been assistant to an undertaker. Pressed for further detail he admitted that he constructed the coffins. Jim, the gaffer, laughed and said he did not want a coffin maker, but he figured if Percy could handle a hatchet and saw, he could build bottom boards, knock flasks together and re-bar them. He proved to be very quick and adaptable, a ready and willing worker and gave highly satisfactory service over a period of many years."

"Then I suppose he built a little house, the rains came and washed him and his house down a man hole and that is the end of the story."

"Tut, tut, my dear lad. Control your impatience. The foregoing is only the beginning. He built a house and the rains came and he had a narrow escape from the manhole, but all these things did not happen until much later. After working for some time at a wage far in excess of anything he had been accustomed to in the coffin shop, he was deeply pained, chagrined, outraged and so forth, to discover that his rate was 5 cents per hour below that of the other carpenters.

"He waylaid Jim one day and respectfully directed attention to this shocking discrepancy. A blinkin' shyme according to the way he looked at it and without the least doubt a glaring example of the miscarriage of justice. 'E would geg-geg-greatly appreciate Jim's kindness in taking whatever steps were necessary to divert another 5 cents per hour into his poke on pay day.

"Jim admitted the justice of his claim and promised to bring the subject to the attention of the proper authorities. However, he warned Percy not to be too optimistic. Wage rates were set up in the general office, and once set nothing short of an earthquake, a fire or a visit from the Four Horsemen of the Apocalypse could change them. I need not tell you," Bill added parenthetically, "that freezing of wages is more or less an old Spanish custom that antedated Pearl Harbor by quite a few years.

"Percy waited with faith and joyful anticipation over several pay periods, but the contents of the old envelope remained unchanged. Finally he screwed up his courage and asked Jim if it would be all right for him to visit the General Superintendent's office and lay the case before that august individual. Jim as-

(*Concluded on page* 122)

Just the place to read Jules Verne's 20,000 *leagues under the sea*

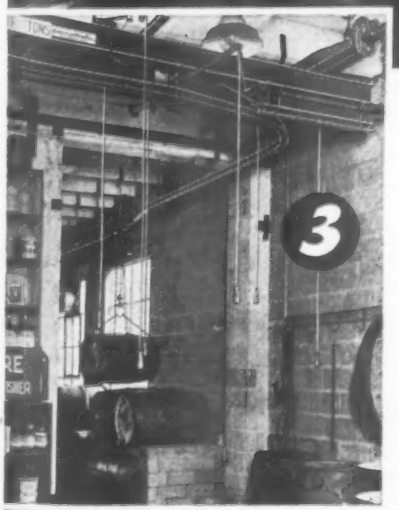
$1140.

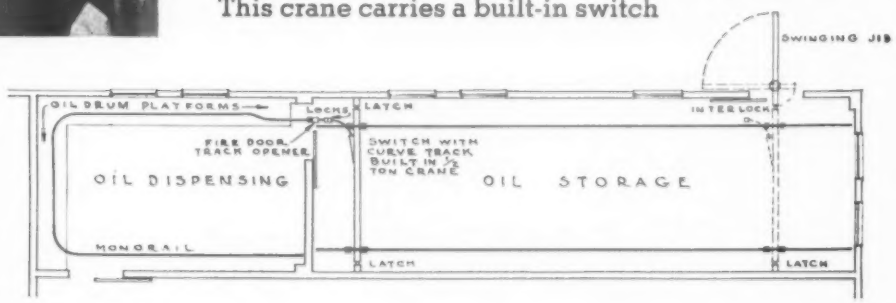
AMERICAN MONORAIL SYSTEM INSURES

FIRE PROTECTION • LOW COST HANDLING • ORDERLY STORAGE

All handling of oil drums through storage and dispensing is done systematically at greatly reduced cost.

This installation represents only a small investment. At a cost of only $1140 the system includes a standard jib crane which interlocks with a special bridge crane inside the oil house. This crane carries a built-in switch





1. Special crane carries drums across switch to track in dispensing room.
2. Loop of track connects through fire door for hoist service over dispensing shelves.
3. Storage crane with built-in switch allows passage of drums through fire door.
4. Swinging jib removed drums from trucks allowing passage to crane in oil house.

permitting passage of hoist to a curve connecting through the fire door to the single track loop of MonoRail around the dispensing room.

Here is another example of a low price system furnishing low cost operation of American MonoRail equipment. Let an American MonoRail engineer show you the answer to your troublesome handling problems at no cost to you.

THE AMERICAN MONORAIL CO.

13104 ATHENS AVE. • CLEVELAND 7, OHIO

(*Concluded from page* 120)

sured him it was a holy and a wholesome thought and wished him the best of luck. The G.S. was up to his ears in a particularly knotty problem and had no time to discuss what to him was a trifling subject. He told Percy to take it up with Jim. For some time Percy see-sawed back and forth between the two offices without any improvement in the situation. In fact, each trip placed him a little further back behind the 8-ball.

"One morning he fortified himself with a few hookers of gin and then watched like Jack at the rat hole until he saw the G.S. enter Jim's office on his usual morning round of inspection. Percy barged into the office looking for all the world like a ferocious rabbit if one can imagine a rabbit with glasses perched on the tip of his nose and droopy moustache all a-quiver. 'Now at last,' he says, 'I got you two double crossers, pass-the-buck, 'igh-jackers and wage freezin' crooks where I wants yer. 'Ow abaht me five cents what I should 'ave 'ad six months ago?' The General Superintendent read him a severe lecture on the evils of intoxication and most certainly he was not going to discuss wages or any other subject with a man in an inebriated condition. 'Away back to your work,' says he, 'and every morning and night get down on your crooked spindle shanks and thank your maker—and me—that you have a job to go back to!'

"The following payday Percy was highly gratified to find that the crooks and double crossers and so forth had put his raise through. There it was, manna from heaven! He promptly went out and got drunk.

"Big Ole Hammerquist trudging home late at night in the face of a driving wind and rain storm found Percy lying in a drain blissfully unconscious of a gurgling stream that disappeared through his shirt collar and ran out again at the bottom of his pants legs. Just like one of the lost rivers in a desert. 'Ole picked him up and carried him piggy-back for about half a mile. Then he borrowed a wheelbarrow from a convenient barn, dumped Percy into it and wheeled him the remainder of the distance.

"At the bottom of a small hill leading up to Percy's house the ricksha man dropped the barrow handles while he drew a long breath and spit on his hands. By this time the passenger was beginning to regain consciousness. Ole told him to keep quiet. He was all right, in the hands of friends and would be home in about two more minutes. That reference to home apparently touched Percy on an exposed and sensitive nerve.

"Mrs. Percy had been constructed and fabricated at a period before ration points, restrictions, priorities or any other inhibitors had been invented. In a nautical comparison you might say she measured 6 feet between perpendiculars, beam in proportion and dead weight in the vicinity of 300 pounds. She was a ready and fluent talker especially on subjects that did not meet with her approval. She also believed in demonstrating with suitable gestures to show who was who and what was what. Liquor drinking, with the inevitable throwing away of money, was her chief and pet aversion. Over a period of several years she had pleaded and argued with Percy and had tried every peaceful method of moral suasion to separate him from the stuff that bites like an adder and stings like a serpent. He was bitten and stung so often, she quit preaching and decided to try the ancient cure known as the laying on of hands. Every time Percy came home with a snoot full, she met him at the door with a baseball bat or other suitable implement and just naturally whaled—that is, I mean to say—she attacked him with great vigor and punished him severely.

"When Ole dropped the barrow, Percy tried to sit up. A faint glimmering in his befuddled mind told him he was near home and the glimmering grew brighter with the realization of the reception which awaited him. 'Hey, kebby,' he says to Ole, 'Lemme out. Lemme out. I'm pu-pu-pufickly all right and can walk the rest of the way. I sy, open the door.' Ole told him politely to shut his trap and keep quiet. Perhaps he could smuggle him into his house and the Missus would not hear him.

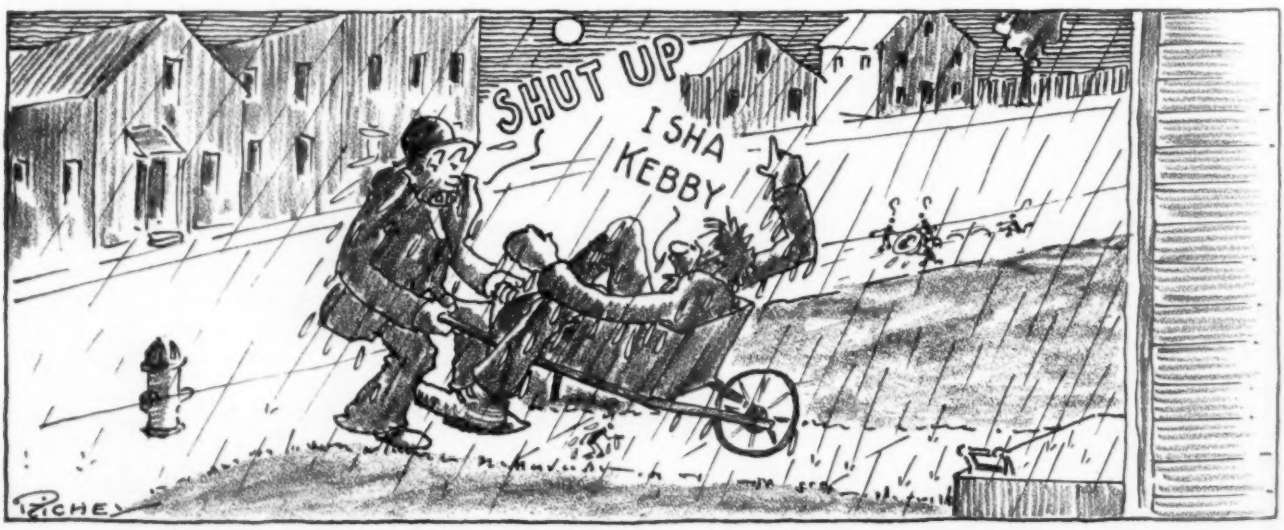
"With the natural perversity of a drunken man Percy could not see or appreciate this well meant piece of advice. He leered up at the Good Samaritan and quavered 'Lemme out! Lemme out! Near home. Who's afraid of the big bad wolf?' Ole again attempted to shush him down, but he would not be shushed. He scrambled to his hands and knees in the bottom of the wheelbarrow. 'Once more kebby,' he says, 'I demand me rights as a free-born British citizen. God save the King! Turn your ugly puss to one side. Open the door and lemme out, or s'help me I'll kick every blinkin' winda outa this contemptable and frowsy rat's nest that you call a keb!' Ole wheeled him up to the front door, dumped him out and left him there. He did not wait to see whether the big bad wolf dragged him into her den, or left him there all night. And that, my dear young friend, is the end of the story."

"Sounds to me like a tall tale from one of these stinging adder places."

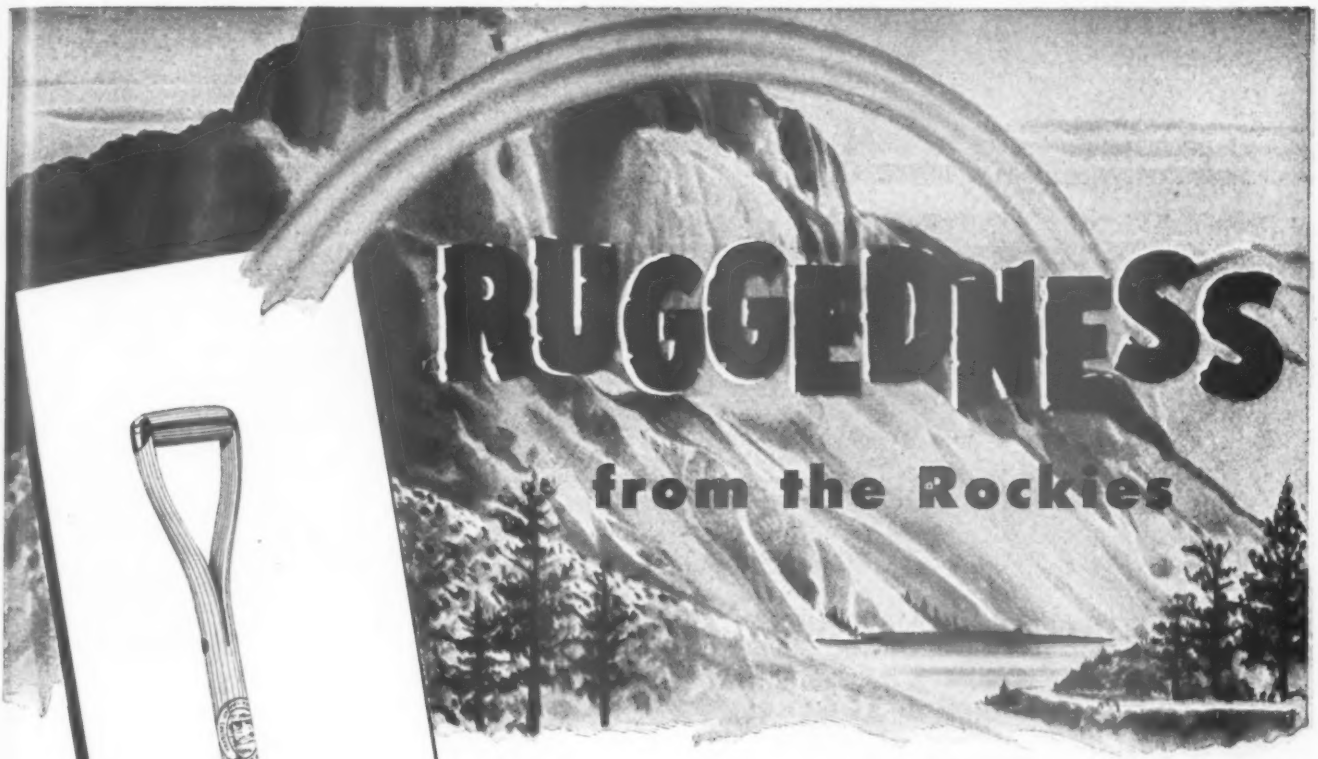
"Not atall, Not a-tall. It is just the exception that proves a certain rule. It goes to show that our well known saying 'The race is not always to the swift, nor the battle to the strong—but that's the way to bet,' isn't sometimes, mostly, generally, nearly always right. Just ponder over that after you finish dragging Bro. Usher from under the ruins of his fallen house."

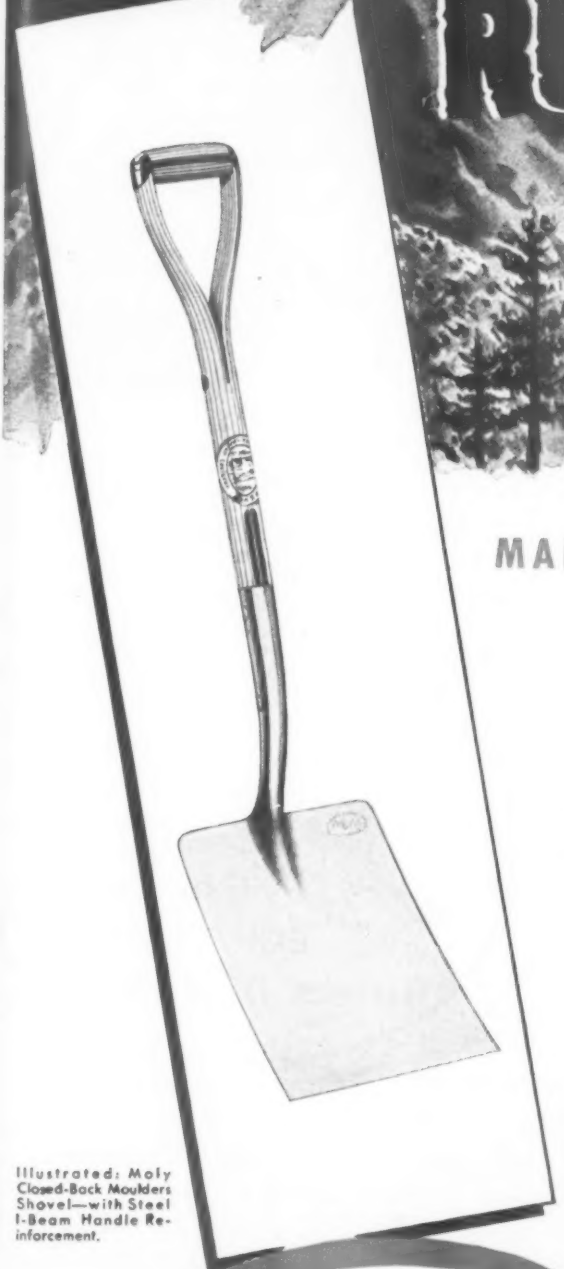
Plant Reconversion

Automotive Council for War Production, 320 New Center Building, Detroit 2, has available for distribution a 17-minute, 16 mm. sound film entitled "The Aftermath of War Production" recommended for groups interested in the reconversion and disposal of surplus war materials.



Pickled passenger indignantly threatens to kick every single window out of the Good Samaritan's cab





Illustrated: Moly Closed-Back Moulders Shovel—with Steel I-Beam Handle Reinforcement.

MAKES WOOD'S Moly SHOVELS OUTWEAR ALL OTHERS!

Magic Mo-lyb-den-um, the miracle mineral mined in the Colorado Rockies, gives Moly Shovels, Spades and Scoops a rugged toughness that even outwears that of the granite peaks among which Mo-lyb-den-um is found.

Moly Shovels, Spades and Scoops, with blades of Mo-lyb-den-um alloy steel made to Wood's own special analysis, have won world-wide reputation . . . have earned exclusive world rights to the name Moly.

Buy these stronger, tougher shovels and watch your shovel costs go down, down and down. Moly means more wear . . . Moly shovels are unconditionally guaranteed to outlast, out-wear all others.

THE WOOD SHOVEL AND TOOL CO.
PIQUA, OHIO

A National Organization Specializing *Exclusively* in Shovels, Spades and Scoops.

Moly REG. U.S. PAT. OFF.

MO-LYB-DEN-UM ALLOY SHOVELS

NOTE — Dial is shown actual size here

PINHOLES
BLOW
RAT TAIL
CASTING DEFECTS
CASTINGS ROUGH
BUCKLE
SCAB
HOT CRACKS
DROP
CASTING DEFECTS
1 Set arrow at CASTING DEFECT.
GREEN STRENGTH
DRY STRENGTH
GREEN PERMEABILITY
RAMMING
MOISTURE
EXPANSION
High No. 6
HIGH No. 7
2 Read CAUSE and REMEDY NUMBER in window.
NOTE: The most important causes of defects are shown in capital letters.
Casting Defect Dial
EASTERN CLAY PRODUCTS, INC. EIFORT, OHIO
3 Refer to table below for remedy.
REMEDIES
1. To Increase Green Strength—Add more bond, mix longer, reduce tempering water, change to a stronger clay, ram harder.
2. To Decrease Green Strength—Use less bond, ram softer.
3. To Increase Dry Strength—Add more bond or more water, mix longer, change to a stronger type of clay, ram harder, add auxiliary binders.
4. To Decrease Dry Strength—Use less water and less bond, use lower dry strength clay, cut down auxiliary binders.
5. To Increase Permeability—
6. To Decrease Permeability—Add fines, use a finer grained sand, ram harder.
7. To Decrease Moisture—Use a stronger type clay, reduce fines, reduce cereal binder.
8. To Decrease Expansion—Add fines, add more clay or sea coal or cereal binder, ram softer.
9. Ramming—Flowability and, therefore, mold hardness is increased by more thorough mixing, reducing clay content or changing to a stronger clay and by using sand of uniform distribution.
10. Ramming—Flowability is decreased by increasing clay content, by adding fines and, principally, by adding cereal binder.
— Same as for Dry
or iron oxide.
—Change type of clay,
ce water content.
—Use
ollapsibili
see remedies
by Eastern Clay Products, Inc., Eifort, Ohio
Step Right Up, Gentlemen!
Get Your ECP Casting Defect Dial FREE!

Simplicity itself: (1) just set arrow to point at defect, and (2) read reason and remedy. The right answer every time! Still another illustration of ECP's desire to help you get better castings and *most bonding strength* for every dollar you invest.

Write for your dial today

EASTERN CLAY PRODUCTS, INC.
EIFORT, OHIO

ECP
DIXIE BOND · BLACK HILLS BENTONITE · REVIVO BOND · REVIVO SUPER BOND · BALANCED REVIVO
All TYPES OF BONDING CLAYS
A Foundry Sand Service Based Upon Practical Research

INDUSTRY ...Briefs

REYNOLDS METALS CO. has started production of aluminum permanent mold castings in the Springfield, Mass., foundry it has leased from the Defense Plant Corp. The foundry is producing aluminum castings for Rolls-Royce Merlin engines now being built by Packard Motor Car Co. and Continental Motors, but the company's plans also call for postwar operation on an enlarged scale. T. A. Lynch, vice president of Reynolds Metals Co., is in direct charge of the Springfield foundry. J. W. Wheeler, manager of the Rolls-Royce plant in Derby, England, is technical consultant.

• • •

Majestic Mfg. Co., St. Louis, has been awarded the United States Maritime Commission "M" in recognition of outstanding performance in the production of heavy duty oil burning ranges and bake ovens for Liberty and Victory ships, tankers, troop carriers and aircraft carriers. A new type of oil-fired oven combustion chamber and heat exchanger, as well as a special type of refractory combustion chamber and range insulation, was developed for marine use.

• • •

Skilsaw Inc., 5033 North Elston Avenue, Chicago, is completing a one-story 50 x 180-foot brick and steel addition to its plant to accommodate its castings cleaning, heat treating, paint spray and packaging departments. This is one of several expansions in the past two years.

• • •

Universal Wheel & Abrasive Corp., 2626 West Van Buren Street, Chicago, has purchased a site at 400 North Ashland Avenue and has started construction of a new plant to provide approximately 25,000 square feet.

• • •

United Boiler, Heating & Foundry Co. Inc., Hammond, Ind., recently completed a one-story, 50 x 200-foot addition to its structural steel department, necessitated by expanding war production.

• • •

Heller Bros. Co., Newcomerstown, O., has received a second white star to add to its Army-Navy "E" pennant originally awarded the company on Sept. 21, 1943. The first renewal of the award was made last March.

• • •

Ergolyte Mfg. Co., Philadelphia, has purchased the Precision Engineering Co., Chicago. Both companies are manufacturers of welding machines.

• • •

Florence Stove Co., Gardner, Mass., planning postwar expansion in the cooking and heating fields, has purchased the electric and gas range business of Cavalier Corp., Chattanooga, Tenn. The latter has withdrawn from the range manufacturing industry but will continue furniture lines and other metalworking items.

• • •

Eastern Malleable Iron Co., Naugatuck, Conn., has acquired the Frazer & Jones Co. Inc., Syracuse, N. Y. The latter, a producer of malleable castings, has been in business for a century. The owners plan postwar expansion of the Syracuse foundry, now employing about 300 workers entirely on war contracts.

• • •

Mine Safety Appliances Co., Pittsburgh, was awarded the Army-Navy "E" at plant ceremonies Sept. 16, becoming one of two Pittsburgh companies to hold both the Army-Navy "E" and the Maritime "M". Only 25 companies in the entire country have been awarded both honors.

• • •

Southwest Foundries is the firm name under which William Lunsford, John Murphy, George May, Tony Hereida, Howard Teagarden and Arthur L. Hobart have published a certificate that they are conducting business at 1254 West Rosecrans avenue, Clearwater District, Los Angeles.

• • •

Herman Pneumatic Machine Co., Pittsburgh, has been granted a second renewal of the Army-Navy "E" Award for meritorious service in war production.

• • •

Merger of Aluminum Manufacturers Inc., Cleveland, with Aluminum Co. of America will be presented to stockholders Nov. 12. The latter company owns 80 per cent of the common and all but 35 shares of the preferred stock of the Cleveland company.

• • •

Fire caused by molten metal splashing against the wooden walls of the building destroyed about half of the foundry of National Foundry & Machine Co., St. Louis, Sept. 12. Estimated damage was $250,000.

• • •

Universal Wheel & Abrasive Corp., Chicago, which purchased the site at 400 North Ashland avenue in that city has started construction of a new and larger plant which will cover the length of the entire block.

• • •

M. Greenburg & Co., 765 Folcom street, San Francisco, plan for construction of a foundry building at Alice and Shipley streets, that city. Estimated cost is $50,000.

• • •

Crane Co., Chicago, was presented with the U. S. Maritime Commission Award of Merit for outstanding achievement in ceremonies at its plant Sept. 22.

• • •

Superior Foundry Co., Cleveland, is planning construction of a new foundry building adjacent to its present plant and installation of new equipment at total cost in excess of $100,000.

• • •

Cooper Alloy Foundry Co., Hillside, N. J. was awarded the Army-Navy "E" on Aug. 23 in recognition of its production of war castings, including those for aircraft super-chargers.

• • •

Jenkins Bros. was granted its fifth Army-Navy "E" award on Sept. 25 at a flag-raising ceremony at the plant in Bridgeport, Conn.

• • •

Torrance Aluminum Foundry Division is the firm name under which James Shortt and Edward W. Barksdale have

(*Concluded on page* 128)

MODERN BETSY ROSS: Mrs. Julia Baugher of the American Foundry Equipment Co., Mishawaka, Ind., sews on the second white star to the company's Army-Navy "E" Production Award pennant while Enoch Fetters, president, Local 995, UAW-CIO, and Otto E. Zahn, assistant works manager of the company, look on. Notification of the award was received in a letter dated Sept. 9 from Robert P. Patterson, Under Secretary of War

CONSERVE MANPOWER . . .

HINES "Pop-Off" FLASKS

Trademark Reg. U. S. Pat. Off.

YOU don't need 50 flasks to make 50 castings. ONE HINES "POP-OFF" FLASK will do all or more than the 50 tight flasks will do. Less equipment to purchase and handle. No stacks of tight flasks taking up valuable foundry space. Each one of the "Pop-Off" Flasks listed below and many others not listed has replaced a set of tight flasks and are turning out heavy castings more successfully at much lower cost. One reason why . . . no shake out costs, just upset the mold and hook the casting out.

American Boiler & Fdry. Co.	★30 x 38	6 cope	5 drag
Badger Foundry Co.	18 x 45	8 cope	6 drag
Belle City Mall. Iron Co.	14 x 53	10 cope	4 drag
Belle City Mall. Iron Co.	17 x 53	8 cope	4 drag
Brillion Iron Works	★30 x 31	17 cope	16 drag
Brown Industries, Inc.	16 x 46	9 cope	7 drag
Burnside Steel Foundry Co.	★24 x 36	12 cope	8 drag
Chicago Malleable Cstgs. Co.	★20 x 42	11 cope	10 drag
Chicago Steel Foundry Co.	★34 x 34	6 cope	8 drag
Cincinnati Steel Cstgs. Co.	16 x 40	8 cope	8 drag
Crucible Steel Castings Co.	20 x 40	9 cope	6 drag
Crucible Steel Castings Co.	★26 x 40	8 cope	5 drag
Dayton Steel Foundry Co.	16 x 42	8 cope	8 drag
Dayton Steel Foundry Co.	★18 x 55	6 cope	8 drag
Dodge Steel Company	24 x 24	10 cope	8 drag
Eastern Malleable Iron Co.	12 x 56	5 cope	5 drag
Forest City Foundries Co.	17 x 40	9 cope	4 drag
Forest City Foundries Co.	24 x 34	9 cope	4 drag
Fort Pitt Mall. Iron Co.	13 x 56	6 cope	4 drag
Fort Pitt Mall. Iron Co.	18 x 44	6 cope	5 drag
General Metals Corporation	★30 x 30	9 cope	4 drag
Glenwood Range Company	★30 x 30	6 cope	4 drag
Glenwood Range Company	★36 x 36	6 cope	6 drag
LaDel Conveyor & Mfg. Co.	★34 x 34	6 cope	8 drag
Lehigh Foundries	14 x 41	6 cope	5 drag
Lehigh Foundries	16 x 48	6 cope	4 drag
Lennox Furnace Company	10 x 44	5 cope	5 drag
McKinley Iron Works	13 x 45	4 cope	3 drag
Michigan Malleable Iron Co.	18 x 48	6 cope	4 drag
Ohio Foundry Company	★15 x 75	8 cope	5 drag
Ohio Steel Foundry Co.	15 x 45	6 cope	5 drag
Refinery Castings Corp.	12 x 50	5 cope	5 drag
Sawbrook Steel Cstgs. Co.	★24 x 24	6 cope	6 drag
Sawbrook Steel Cstgs. Co.	34 rd.	6 cope	5 drag
Spencer Heater Co.	34 x 34	15 cope	11 drag

THE HINES

1324 HIRD AVENUE

..SAVE FOUNDRY SPACE...

THIS "POP-OFF" IS

30" x 31"

17" COPE — 16" DRAG

No bars. The casting, gate and feeder weigh

475 lbs.

S FLASK CO.

CLEVELAND 7, OHIO

EQUIPMENT MANUFACTURERS

Draw Heavily to Annual Meeting

ANNUAL meeting of the Foundry Equipment Manufacturers Association held at Hot Springs, Va., Oct. 13-14, drew the largest attendance in the history of that organization. The meeting was opened by Ralph W. Hisey, president of the association and vice president, Osborn Mfg. Co., Cleveland, who outlined the work of the various committees during the past year. Mr. Hisey also stressed the valuable contacts which the executive secretary has made with various departments in Washington and with other organizations connected with the foundry industry during the past year.

Bradley Stoughton, Foundry Equipment and Supplies Section, Tools Division, War Production Board, Washington, discussed the problems of equipment manufacture in connection with the WPB. Mr. Stoughton stated that Order E-11 had been revoked and that it was believed further revocations of WPB orders would follow. Mr. Stoughton declared that the average backlog of the foundry equipment industry was from 3 to 3½ months. The problems connected with accepting unrated orders were discussed in some detail.

Riley M. Simrall, Processing Machinery Section, Machinery Branch, Office of Price Administration, Washington, discussed at some length the various problems connected with reconversion pricing. Mr. Simrall outlined the basic concepts of the Price Control Act and discussed a recent memorandum of Chester Bowles, administrator of the OPA, addressed to all members of the OPA Advisory Committee. The speaker indicated the hope that an industry advisory committee for the foundry equipment industry would be set up at an early date.

Report of the Finance Committee was made by Arthur J. Tuscany, executive secretary and treasurer of the association; of the Membership Committee by Otto A. Pfaff, president and general manager of the American Foundry Equipment Co., Mishawaka, Ind.; and of the Committee on Taxes by W. L. Dean, vice president and general manager, Mathews Conveyer Co., Ellwood City, Pa.

At the second session the various members reported on several questions designed to indicate the general business situation in the equipment industry. This was followed by a discussion led by Arthur J. Tuscany, designed to indicate some of the future activities of the association.

"War Time Changes and Postwar Outlook of the Foundry Industry" was the subject of a presentation by J. M. Lathrop, advertising manager, THE FOUNDRY, Cleveland, which included tabulations from a survey recently conducted by THE FOUNDRY. These data indicated the probable extent of equipment purchases by foundries in the period following removal of priorities.

At the banquet plaques were presented to Thomas Kaveny Jr., vice president, Herman Pneumatic Machine Co., Pittsburgh, and to Frank G. Steinebach, editor, THE FOUNDRY, Cleveland, for their work with the Foundry Equipment Section of the WPB.

The following directors were elected: M. F. Becker, vice president, Whiting Corp., Harvey, Ill.; H. S. Hersey, vice president, C. O. Bartlett & Snow Co., Cleveland, and P. J. Potter, vice president, Pangborn Corp., Hagerstown, Md. At the annual meeting of the board of directors following the business session, Thomas Kaveny Jr., Herman Pneumatic Machine Co., Pittsburgh, was elected president and Otto A. Pfaff, American Foundry Equipment Co., Mishawaka, Ind., vice president.

BATTELLE HONORED: Scene at presentation of the Ordnance Distinguished Service Award by the War Department to Battelle Institute, Columbus, O., in recognition of outstanding contributions to ordnance progress. Left to right: Clyde Williams, director of Battelle; Maj. Gen. C. T. Harris Jr., commanding general of Aberdeen Proving Ground; Dr. Frank B. Jewett, president of National Academy of Sciences, chairman of Bell Telephone Laboratories and principal speaker for the occasion

Brazilian Society Elects Officers

Elections for the executive board of Associacao Brasileira de Metais— Brazilian Society for Metal—have been announced. The following, all chosen from the Board of Directors previously elected, will serve as officers of the society: President, Col. E. de Macedo Soares e Silva; vice president, Miguel Siegel; secretary, Tharcisio D. de Souza Santos; and Treasurer, Luiz Dumont Villares.

Industry Briefs

(*Concluded from page* 125)

published a certificate that they are conducting business at 1030 Engrana avenue, Torrance, Calif.

• • •

Sales of foundry equipment in August represented 450.5 per cent of the 1937-1939 monthly average, compared with 375.8 per cent in July and 390.4 a year ago, according to the Foundry Equipment Manufacturers Association.

• • •

Garrett Supply Co., Los Angeles 11, has been appointed distributor for the Southern California-Arizona area of Carboloy Co., Detroit, supplementing direct service operations of its branch in Los Angeles.

• • •

Storage Battery Division, Philco Corp., Trenton, N. J. has been awarded the fifth renewal of its Army-Navy "E" Award in recognition of its war production record.

• • •

Bridgeport Deoxidized Bronze & Metal Co., Bridgeport, Conn., plans to rebuild its plant, destroyed by fire, at cost of about $40,000.

• • •

Kent Foundry Co., Grand Rapids, Mich., has obtained building permit for a foundry structure to cost about $15,000.

What ROSS Has Done For Aluminum and Magnesium

Reproduced from advertisements featuring ROSS advanced oven designs for Aluminum and Magnesium foundries.

can be done to benefit the

GRAY IRON FOUNDRY

Solving the new production problems presented by the introduction of light weight metals has resulted in major advances in former methods for baking and treating that are proving profitable for the Gray Iron foundries as well.

Recent ROSS developments in zone heating, control and uniformity of temperatures, and air distribution, have made possible new standards of capacity, quality and quantity of output that will prove highly advantageous in the production of gray iron castings.

New improved design, construction and operating features are available in ROSS Ovens of continuous, compartment or stationary types — for every step in processing from the core to the finished casting. Consider them in your plans for post-war production.

Consult Us On Your Foundry Ventilation Problems.

Proper foundry ventilation need no longer prove a problem in maintaining working comfort and efficiency. ROSS engineers, with a background of 25 years experience in this field, will gladly explain the most modern methods for providing ideal conditions.

ROSS SYSTEMS

J.O.ROSS ENGINEERING CORP.

350 MADISON AVE., New York 17, N. Y.

CHICAGO – 6
201 North Wells St.

BOSTON – 9
79 Milk St.

DETROIT – 3
12953 Greeley Ave.

ROSS ENGINEERING OF CANADA, LTD., Dominion Square Building, Montreal, P. Q.

CONTROL OF AIR FOR MODERN INDUSTRY

foundry DEVELOPMENTS

REPORTS from England indicate successful application of a new principle in gas-fired furnaces which is claimed to show a saving of 10 per cent in fuel with temperatures around 930 degrees Fahr., and about 40 per cent with temperatures around 2550 degrees Fahr. Limitations of refractories employed show the most suitable maximum operating temperatures to be 2370 degrees. Principle involves an inner wall in the furnace comprised of cellular, permeable refractory brick surrounded by an annular chamber, around which is constructed the regular refractory furnace wall. While not definitely stated, combustion presumably occurs within the furnace since the hot gases are withdrawn into the annular chamber by an exhaust fan. It is claimed that considerable heat is given off by gases in their passage through the permeable brick, and the temperature of the effluent is much lower than for the conventional furnace. Also more uniform heating is possible since the gases are withdrawn through the whole wall structure.

♦ ♦ ♦

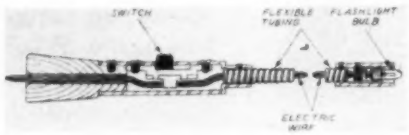
LININGS of oil and gas-fired crucible furnaces should be smooth to prevent deflection of the flame against the pot wall and forming a localized hot spot. Distance between pot wall and furnace lining should be such that free circulation of combustion gases heat the crucible uniformly on all sides. Too little space will cause entrapment of heat around the bottom of the pot leaving the top cold. Too large a space will tend to short-circuit the hot gases out through the top before they have circled the pot, and will result in considerable waste of heat as well as non-uniformity of heat distribution around the crucible.

♦ ♦ ♦

IN MANY foundries there is a tendency to use equipment too slow in speed for efficient results with small accessories, mounted wheels, small rotary files, etc. In extreme cases slow speed flexible shafts designed for use with relatively large grinding wheels, are employed with small mounted wheels, in some instances not larger than ¾-inch in diameter. Speed of these shafts usually does not exceed 3500 revolutions per minute. Obviously with a wheel as small as ¾-inch diameter working on a hard casting, the wheel life will be very limited. Many cleaning rooms are in need of modernization and a more general use of high speed portable tools ranging from the ordinary alternating 110-volt tool to the more advanced high cycle type using as high as 440 volts. Compressed air equipment also is highly efficient. Rotary files or miniature cutters should not be used on high speed equipment. The life is not long for wheels should be used.

♦ ♦ ♦

AN IDEA submitted to War Production Drive Headquarters, Washington, by Charles W. Shaw and Marion McCalley, Packard Motor Car Co., Detroit, received an award, and is designated suggestion serial No. 2343. It concerns a flexible and portable light of sturdy construction for visual inspection of deep



castings, and shown in the accompanying sketch. The lights, built in the Packard plant for $7.90, use standard flashlight bulbs costing 3 cents each, and replace expensive medical lamp instruments costing $35 to $50. The lights are used in the foundry and machine shop for inspection of castings with deep pockets or intricate passageways.

♦ ♦ ♦

MID-WEST manufacturer of gears formerly employed chunks of old tires as part of the load in a tumbling device where the castings are cleaned by the combined action of tumbling and a stream of metal abrasive propelled with great force from a wheel by centrifugal force. The rubber buffer material has been replaced by a quantity of rubber electric sockets rejected by the maker on account of some defect. After a year's operation these little rubber pieces showed no sign of wear, and apparently will last indefinitely.

♦ ♦ ♦

HARDLY a person exists who has not heard about electronics, and if some of the possibilities come to pass as implied in the popularized descriptions, they may do everything for us, but eat, sleep and drink. However, electronics perform many valuable functions, and development and applications still are going on. As pointed out in a pamphlet recently published by the Bureau of Mines on "Electrical Devices Applied to Metallurgical Research," by E. V. Potter electronic apparatus and equipment using electronic circuits in their operation cycle are so numerous in metallurgy that any attempt to discuss each application even briefly, is not possible in any article of reasonable length. For example in the field of physical metallurgy such apparatus as electrostatic separators, automatic furnace controllers, induction furnaces, rectifiers, microscopes, and x-ray units involve electronic devices. Also in the associated chemical work, titrimeters, conductivity bridges, colorimeters, pH meters, and polarographs employing electron tubes find extensive applications.

♦ ♦ ♦

A DEVICE has been developed recently for salvaging and grading broken shot from blasting machines. The spent abrasive is fed into it at one end and delivered through separate spouts at the other end. It is of dust tight construction and operated by a motor driven shaker.

♦ ♦ ♦

NORTHWEST foundry recently has introduced in its compressor room something new for the foundry industry. Not only is all the air entering the compressors filtered twice but the room in which the compressors are housed is kept under slight positive pressure to prevent dust from seeping in through openings around the doors and windows. In addition to making sure that no damaging grit will get into the compressors, this conditioning of the air service serves to keep the room cool in summer.

♦ ♦ ♦

CAUSE of a casting defect usually is the result of a combination of factors rather than a single one, and hence it is possible to have one or more direct and indirect conditions which collectively bring about the trouble. As a rule it is advisable to change conditions to eliminate the direct cause, but under certain conditions elimination of the indirect cause alone may be quite effective. For example mold condition is the product of sand conditions such as moisture, permeability, strength and mold hardness, and those may function as direct and indirect causes of defects. Types of mold conditions which may cause various casting defects charged to sands, and their remedy are tabulated in an elaborate and interesting chart presented in the July issue of *Foundryman's News Letter*, published by Harry W. Dietert Co., Detroit. As pointed out the chart is presented not as a conclusive work, but rather as a suggestive guide which may prove helpful in the advancement of casting science.

E. B.

TOPS IN THE FIELD... AND IN FOUNDRIES!

HIGH
IN V.C.M. (Volatile)

Crown Hill Seacoal vents rapidly due to its high volatile content which ensures quick ignition and a long flame. To vent the mold quickly is the primary function of a seacoal—that's why we selected the high volatile, quick-flash coal from which Crown Hill Seacoal is made.

CROWN HILL

SEACOAL FACING

LOW IN
SULPHUR AND ASH!

Crown Hill's low sulphur content eliminates hard spots in castings caused by sulphur pick-up. The fusion point of the little ash residue left from Crown Hill seacoal is 2980° F.—molten iron can't fuse it. Castings peel easily—cleaning costs come down when you use Crown Hill.

CROWN HILL MEANS QUALITY SEACOAL

Try It... **IN YOUR FOUNDRY!**

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activities of foundry GROUPS

Reading

REGULAR monthly meeting of the Reading Foundrymen's Association was held at the Berkshire Hotel, Reading, Pa., Sept. 19. Hermann P. Good, president, presided, with 75 members and guests present. Speaker of the evening was Walter S. Giele, of the Walter Giele Co., engineers specializing in foundry plants, Lebanon, Pa., whose subject was "Materials Handling Equipment for the Foundry."

Showing how mechanical conveyance in heavy industry has been adopted in an effort to overcome manpower shortage, Mr. Giele presented a number of slides depicting actual installations of cranes and conveyors in industries. "In modern industry today it is possible to bring the tool to the job rather than have to carry the job to the tool," stated Mr. Giele.

Two films released by the Third Service Command were also shown, "Men of Fire" and "The War Speeds Up," in which the vital importance of castings in production of war equipment was graphically emphasized. Both films showed actual combat scenes including pictures of landing operations in Normandy and the capture of St. Lo. Lt. J. C. Golden, representing the Third Service Command, made a brief plea for increased production, emphasizing that, through preponderance of equipment, American lives are being saved in combat.

Mr. Good welcomed the members and promised a series of beneficial and instructive meetings during the coming season. He added that as an industry we know what is expected of us and said that the same efforts as in the past would be made to meet requirements of the armed forces.—*H. C. Cummings, secretary.*

E. Canada-Newfoundland

THE Eastern Canada and Newfoundland Chapter of the A.F.A. got its 1944-45 activities away to a good start at the opening meeting Sept. 22 in Montreal. The speaker was Joseph Sully, Sully Brass Foundry Co. Ltd., Toronto, a national director of the association. He opened his talk by extending greetings from the national office to all members in both English and French and briefly outlined the aims and services of the A.F.A.

Mr. Sully took as his subject "Romance in the Foundry Industry" and pointed out that the romance and interest lay in the wide variety of problems there were to be solved.

The greatest problem today is the relationship between capital, labor and management. Capital furnishes the plant and equipment; labor the skill and actual work in producing the finished product. Management supplies the direction, technical, engineering and sales ability to bring these two together to make the finished product, and then sell it. Each depends on the other and there can be no new world order unless all co-operate.

A major problem in the industry today is the shortage of skilled men. Mr. Sully urged that all foundries make efforts to attract more men to the trade by improving working conditions and plant facilities and keep them interested by personal contact. He complimented the chapter on the work of its educational committee along these lines.

Dealing with technical problems in the manufacture of castings, such as sand, metal, gates and risers, Mr. Sully outlined the work of the A.F.A. He pointed out how knowledge is pooled and published for the benefit of all members.

Foundrymen were urged to take pride in their work, to insure that its quality was up to standard and sold at a fair price. A number of factors entering into the cost of a casting and which are sometimes overlooked, were mentioned. The actual costs of castings must be known in order to set prices intelligently.

Mr. Sully concluded by pointing out that the brighter days which lie ahead will depend on the extent to which we can be content with a reasonable portion of this world's goods and a just amount of happiness. This can only come through a willingness to work together not only for our own good but for the

(*Continued on page* 135)

"VICTORY OUTING" was the name given to the annual picnic held by the Western New York Chapter, A.F.A., on Sept. 16 at Sturm's Grove, Buffalo. Buffet lunch was served continuously from 3 to 9 p. m. War Bonds and Stamps were awarded as prizes in the various games. Outcome of a baseball game between foundrymen and vendors proved somewhat inconclusive due to varying reports on the final score. Perfect weather contributed to an enjoyable time by the approximately 360 members and guests who attended. Photos courtesy of Harold R. King, Buffalo

TOUCHDOWN!

Winning touchdowns come from tightly-knit team play—eleven men all working toward one goal—that's teamwork. Back of profitable casting production is more teamwork — good men using good methods working with good materials.

MOGUL CEREAL BINDER . . . *saves binder costs;* reduces baking time and cleaning costs; increases oven capacity and core production . . . PRODUCES QUALITY CASTINGS.

MOGUL is a perfect Green Bond, which increases permeability in cores and bonds. MOGUL can be used in cores when both green and dry strengths are required.

MOGUL works with core oil, because it decreases drying time, and produces smooth cores. MOGUL works perfectly with pitch or resin, too, because cores can be handled while still warm. MOGUL is widely used with sharp sand.

Team up with MOGUL and KORDEK — you can depend on them.

KORDEK

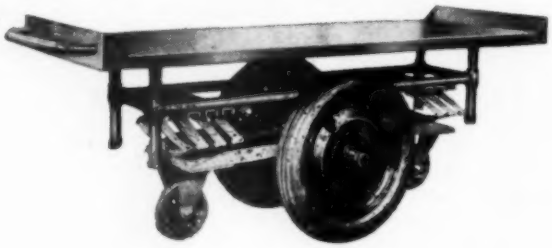
Kordek is a perfect DRY BOND. Kordek can be used in smaller proportions than most dry binders. Produces better castings with fewer discards.

CORN PRODUCTS SALES CO. 17 BATTERY PLACE NEW YORK 4, N. Y.

Modernize Core Handling With
CMD PNEUMATIC CORE TRUCKS

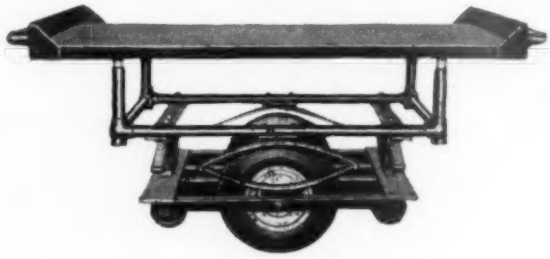
Only CMD Pneumatic Core Trucks offer this patented inner coil spring construction in upright supports. It assures full resiliency even under light loads.

It has always been good business to minimize core damage by carrying cores in CMD Pneumatic Core Trucks. Now, with a manpower shortage, it is more important than ever to use this time-saving equipment. CMD Pneumatic Core Trucks are reducing handling costs from 50 to 75 per cent in leading war plants. Their exclusive *inner coil spring* in the upright supports, and pneumatic tires, provide maximum resilience for full protection against breakage. Write for 4-page folder on CMD Core Trucks and other foundry specialties.



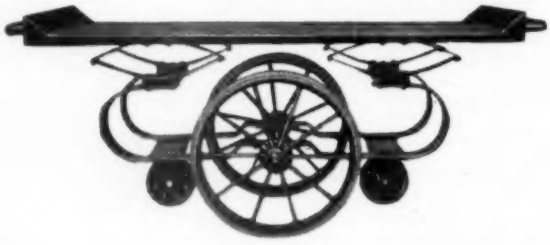
TYPE A-27

This giant carrier can carry loads up to 1400 lbs., yet is amazingly "gentle" in protecting cores against chafing and breakage. It has 4-ply pneumatic tires, sturdy elliptical springs and the famous CMD coil spring in each of the four upright supports. Made in 3 sizes: 27" x 60", 27" x 72", and 27" x 84".



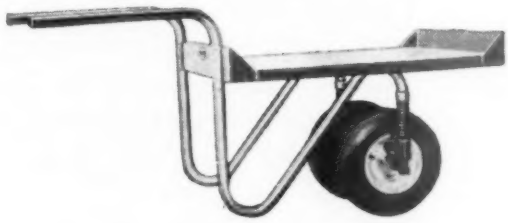
MODEL A-27-J

Pneumatic tires and a combination of coil springs and elliptical springs (in the upright supports) give this medium capacity truck ample resilience to protect cores from damage. Loading tray is 27 inches wide by 60 inches long and is made of heavy sheet steel, well reinforced. Load capacity, 600 lbs.



RESILIENT CHASSIS TYPE B-1

Where utmost resilience is of prime importance, this truck with its specially heat-treated spring-steel chassis and intermediate elliptical springs just below the loading tray is first choice of experienced foundrymen. Your choice of pneumatic tires or solid rubber tires. Load capacity, 700 lbs.



CMD PNEUMATIC CORE BARROWS

Available with single wheel or two wheels, these light, easy-to-handle barrows simplify safe handling of cores in "hard-to-get-into" places around your foundry. Loading surface 24" x 40".

Manufacturers of a complete line of core-conveying equipment and other foundry specialties

CHICAGO MANUFACTURING & DISTRIBUTING CO.

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STAFF OFFICERS OF THE AMERICAN FOUNDRYMEN'S ASSOCIATION

WILLIAM W. MALONEY NORMAN F. HINDLE JENNIE REININGA ROBERT E. KENNEDY C. E. HOYT

AT THE last annual meeting of the American Foundrymen's Association's board of directors, staff officers of the society were elected as follows: Secretary, Robert E. Kennedy; director of the newly-created technical development program, Norman F. Hindle, previously assistant secretary; treasurer, C. E. Hoyt; assistant treasurer, Jennie Reininga; business manager, William W. Maloney, previously assistant secretary.

Robert E. Kennedy, associated with the A.F.A. for 23 years, was graduated from the University of Illinois, where he spent a number of years as instructor and later as assistant professor in charge of foundry practice. During this period he also obtained considerable practical experience in foundry work at various plants. During World War I he served with the Ordnance Department at the Watertown Arsenal steel foundry and the Aberdeen Proving Grounds. Mr. Kennedy joined the A.F.A. staff in 1921 as assistant secretary. He was elected technical secretary in 1925 and secretary in 1938. Last year he became administrative head of the association when the office of executive vice president was combined with that of secretary.

C. E. Hoyt long has been active in foundry association work. While a member of the engineering faculty of Lewis Institute, Chicago, he served as secretary-treasurer of the Chicago Foundry Foremen's Association, forerunner of the Chicago Foundrymen's Club and the Chicago Chapter of the A.F.A. In 1908 he was elected secretary-treasurer of the Associated Foundry Foremen of America and the following year was named secretary of the Foundry Supply Association. Mr. Hoyt continued in the latter capacity and with the association's successor, the Foundry & Machine Exhibition Co., until 1916 when the exhibits were taken over by the A.F.A. and he was made manager of exhibits. In 1918 he was elected secretary-treasurer of the A.F.A., and in 1926 he was named executive secretary, treasurer and manager of exhibits. Mr. Hoyt relinquished part of the latter duties in 1941, continuing as manager of exhibits, and since last year serving as treasurer.

Jennie Reininga joined the A.F.A. staff in 1918 when the association took over the foundry exhibit handled previously by the Foundry & Machine Exhibition Co. in connection with the annual conventions of the A.F.A. For the preceding 7 years Miss Reininga had been assistant to Mr. Hoyt, then secretary of the exhibition company. With the A.F.A. Miss Reininga continued as assistant to Mr. Hoyt until 1929 when she was formally elected assistant secretary-treasurer.

Norman F. Hindle has been associated with the foundry industry since his graduation from Purdue University in 1925. He first joined the American Steel Foundries at the Alliance, O., plant as a laboratory chemist. In 1926 he was made chief chemist of the company's Indiana Harbor, Ind., plant where he remained until 1928 when he resigned to join THE FOUNDRY, Cleveland, as assistant editor. Leaving there in 1931 Mr. Hindle became chief process inspector with American Steel Foundries and in 1933 went with the A.F.A. at Chicago. He was appointed assistant technical secretary in 1936, technical secretary in 1938, and from 1940 until his recent election as director of the technical development program, he served as assistant secretary.

William W. Maloney, a graduate of the University of Illinois with the degree of bachelor of science in commerce and administration, has had extensive experience in publication, publicity and advertising work. For a time he was with the Penton Publishing Co. at Cleveland and Chicago in an editorial capacity. Following a year spent on a merchant ship in the Southern Pacific he joined the *National Provisioner*, Chicago, leaving there in 1929 to go with the A.F.A. where he assisted in publication work of the association. Four years later he became associated with the Drover's Journal Press, Chicago, doing printing and publicity work. In 1935 Mr. Maloney joined the Chicago, Burlington & Quincy railroad in an advertising capacity. He returned to the A.F.A. in 1942 as staff assistant and was made assistant secretary in 1943, holding this position until his recent appointment as business manager.

(*Continued from page* 132)

good of the other fellow.

Robert Bernard, chairman, presided over the meeting and announced the appointment of O. L. Voisard, Robert Mitchell Co., to the board of directors. Twenty-four new members were introduced, which is an excellent start for the season.

A. E. Cartwright, chairman of the program committee, outlined the plans for the season and said that group discussion meetings had proved to be so popular that they would be held more frequently. Formal talks by a number of outstanding speakers also have been arranged, and these will be on general topics.

The chapter is sponsoring evening courses in molding and patternmaking at the Montreal Technical School this year. It is expected that enrollment will exceed the capacity of 24 in each class. In outlining the work of the educational committee, H. Louette, its chairman, told of the plans being made to show various foundries to high school boys with a view to encouraging them to enter the trade upon graduation.—*G. Ewing Tait, vice chairman.*

Chicago

ACTIVITIES of the Chicago Chapter of the A.F.A. for the 1944-45 season got off to a good start Oct. 2 with the first technical meeting at the customary quarters at the Chicago Bar Association. The program, attended by over 175 members and guests, was devoted to "Trends of Employe Relations."

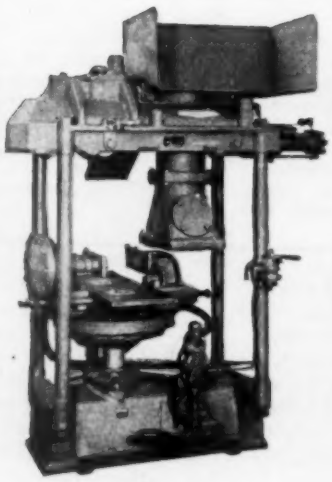
Chapter President Arthur S. Klopf, manager of the iron division, Firegan Sales Co., presided at the dinner, and J. C. Gore, Chicago manager, Werner G. Smith Co., chapter vice president and chairman of the program committee, directed the technical session.

Speaker was J. D. Gruener, assistant manager of the personnel department, International Harvester Co., Chicago. At the outset, he asserted that good employe relations are the very foundation of good industrial management, and his subsequent remarks were keyed to this premise. It is necessary, he emphasized, that high standards be adopted and proper steps taken to make them effective and operative.

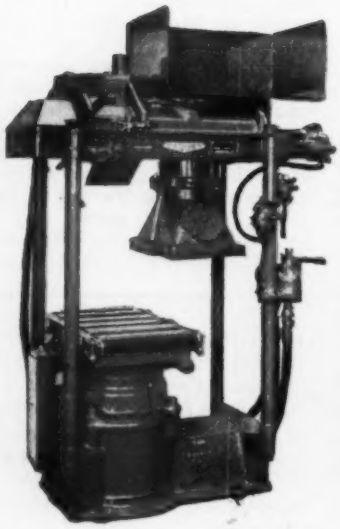
Among important phases of the employe relations subject, Mr. Gruener listed and discussed the re-employment of war

(*Continued on page* 138)

#91 Osborn Blower



#93 Osborn Blower



#193 Osborn Blower, draw piston type

#94 Osborn Blower

OSBORN DESIGNS AND BUILDS SPECIAL PURPOSE BLOWING MACHINES for unusual operations. Outstandingly successful have been high speed core blowing units for production of barrel and crankcase cores for automotive cylinder blocks.

HAVE YOU SEEN OSBORN'S

Improved

CORE BLOWERS

OSBORN features the most complete line of core blowers—*better-performing core blowers*—to be found anywhere. Illustrated (left) are only four of ten individual machines. This complete line includes diaphragm type and draw type vertical clamp blowers.

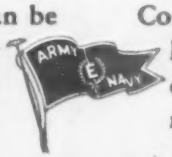
All are designed with a streamlined simplicity which results in easier maintenance and easier operation. You get better and faster production at a lower unit cost.

Because of their greatly simplified adjustments, Osborn core blowers are extra-versatile, can be quickly converted to accommodate varying sizes of core boxes. Short-run jobs can be handled with a minimum of set-up time.

Osborn core blowers are equipped with unusual safety devices. For instance: a safety latch prevents movement of the sand reservoir unless and until the operator's hands are clear of the machine; a safety valve prevents blowing until the core box is properly located and clamped in the machine.

Many Osborn core blowers can be equipped with an automatic operating valve which controls all machine operations with one lever movement.

Core box handling equipment is available for larger jobs, to facilitate handling of the core box in and out of the machine, and for removing core from box.



THE OSBORN MANUFACTURING COMPANY

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OSBORN

MOULDING MACHINES

(*Continued from page* 135)

veterans, absenteeism and labor turnover, safety, employment stabilization, employe publications, and food service.

In answering questions, the speaker stated that the nature of foundry work, as compared with many other types of work is responsible for the relatively poor showing in attracting new employes, and for the higher rates of turnover and absenteeism. Considerable discussion centered around this situation and what might be done about it, but without definite conclusions.

Chairman Klopf announced that plans are under way with Illinois Institute of Technology for a choice of study courses at the institute during the coming year. These courses, available to designated young foundrymen, are made possible through the Engineering, Science and Management War Training Program, United States Office of Education. Last year, the only course offered was one on metallurgy of cast iron, but it proved so popular to the first class of 15 that it was repeated for a second group. This year, there are prospects for courses on metallurgy of cast iron, cast steel, or brass and bronze, and a fourth on foundry safety and hygiene has been suggested.

A new feature in the Chapter's program this year is an Old Timer's night to be held in early December. On this occasion, foundrymen in the Chicago district with 50 or more years' service in the foundry will be honored at a dinner party tendered by the chapter, regardless of whether or not these veterans are members of the A.F.A. A special committee is seeking the names of foundrymen who can qualify.

Next regular meeting of the chapter will be held on Nov. 6 and the program will be the first of the series of roundtables.—*Erle F. Ross.*

Saginaw Valley

THE newly organized Saginaw Valley Section of the Detroit Chapter of A.F.A. held its first regular dinner meeting of the season, Oct. 5, at Frankenmuth, Mich. Approximately 200 members and guests from Saginaw, Flint, Bay City, Lansing, Midland, Vassar, Owosso, Lapeer, and Albion were present. Also on hand for the opener were F. J. Walls, vice president of the national organization and R. G. McElwee, chairman of the Detroit Chapter.

After partaking of the famous Frankenmuth chicken dinner, the foundrymen were entertained by the clever magic of Jack Lathrop, advertising manager of THE FOUNDRY.

Principal speaker of the evening was Harry Dietert, Detroit, whose topic was "Mold Atmosphere Control." Colored motion pictures and slides were used to portray the action of various atmospheres and various facing materials upon the sand and casting in a mold. The interest shown in the subject was evidenced by a lively discussion following the talk.

The Saginaw Valley group now has a membership of 225, and applications are continuing to come in. With such a membership already established, and such enthusiastic first meeting, this group is assured of a successful season.

The program for the remainder of the 1944-45 season is as follows:

Nov. 2—Nathan Janco, Centrifugal Casting Co., Tulsa, Okla., "Centrifugal Casting Methods."

Dec. 7—L. A. Danse, General Motors Corp., Detroit, "Future of the Casting Industry."

Jan. 4—C. E. Bales, Ironton Firebrick Co., Ironton, O., "New Developments in Foundry Refractories."

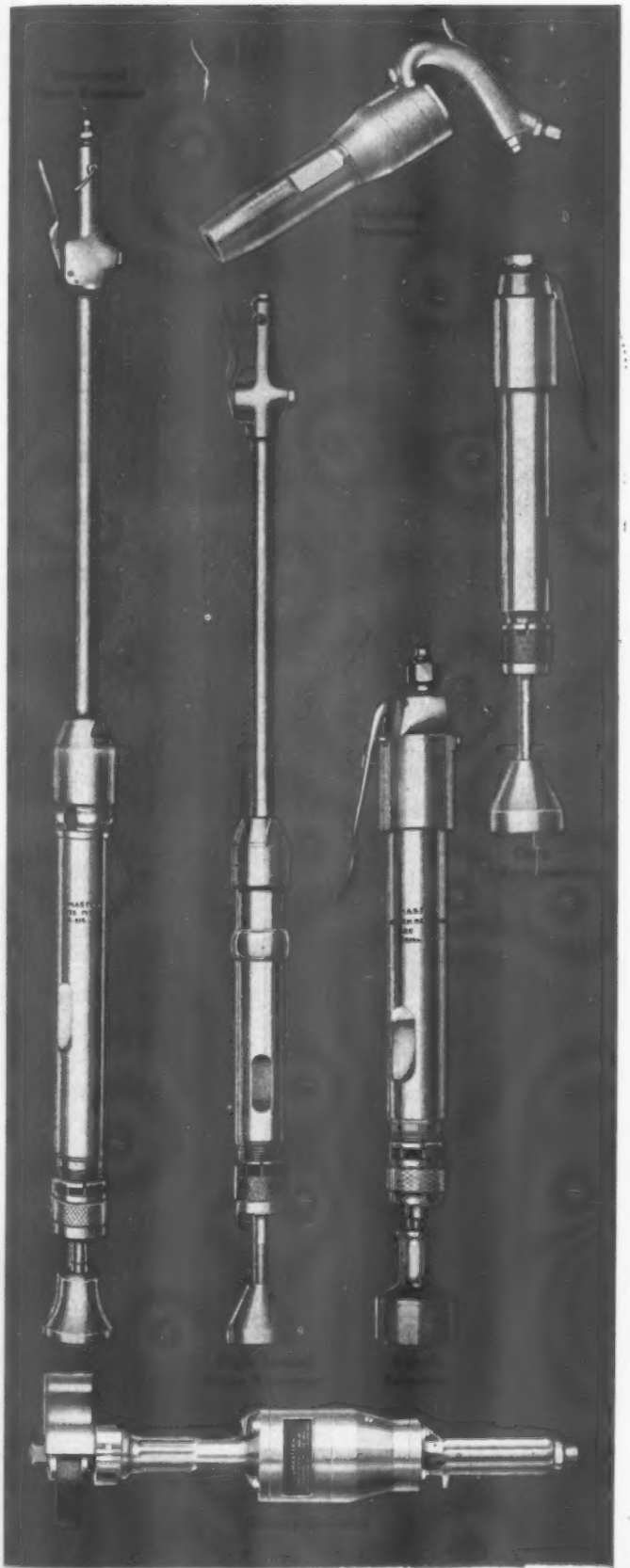
Feb. 1—A. L. Boegehold, General Motors Corp., Detroit, "Modern Cast Iron."

March 1—J. A. Gitzen, Delta Oil Products Co., Milwaukee, "Physical and Chemical Properties of Core Binders, Core Washes and Their Reactions in Contact with Molten Metals."

April 5—Anthony Cristello, Eclipse Pioneer Division of Bendix Aviation, Teterboro, N. J., "Nonferrous" (Subject to be announced later).

(*Continued on page* 140)

SAGINAW VALLEY: Views at opening meeting of 1944-45 season of Saginaw Valley Section, Detroit Chapter, A.F.A. Shown, left to right, at speakers' table in top photo are: H. G. McMurry, secretary-treasurer; R. G. McElwee, chairman (Detroit Chapter); H. W. Dietert, speaker; C. W. Morrison, chairman; J. M. Lathrop, THE FOUNDRY; A. E. Rhodes, director; F. J. Walls, vice president, A.F.A.; John Smith, director. Photos courtsy of Joseph J. Clark, publicity committee



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pioneered hard chrome plating to lengthen the service life of pneumatic tools

● Cylinders of all "MASTER" Tools and piston rods of all "MASTER" Rammers are hard chrome plated to give up to three times normal life. Because hard chrome plated cylinders hold their size longer, air loss is minimized and rated power and efficiency are sustained over a much longer period of time. Results—more production, fewer repairs, lower air costs.

You can profit by "MASTER" construction by specifying any of the Type Numbers listed below when you are again in the market for pneumatic tools.

"MASTER" Chipping Hammers

Light—No. 1 Medium—No. 2 Heavy—No. 3

"MASTER" Rammers

Floor, Standard, No. 1-F Floor, High Speed, No. 2-F
Bench, Standard, No. 1-B Core, No. 2-B

"MASTER" Rotary Grinders

6" Wheel—No. MG600 8" Wheel—No. MG800

Detailed Literature on "MASTER" Pneumatic Tools and "MASTER" Chisel Chart sent on request.

"MASTER" PNEUMATIC TOOLS

MADE BY

MASTER TOOL COMPANY, INC.

5605 Herman Avenue • • Cleveland 2, Ohio

● SALES AND SERVICE FROM COAST TO COAST ●

(*Continued from page* 138)

May 3—James H. Smith, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich., "Progress with Better Methods and Motion Study."—*J. J. Clark Publicity Committee.*

Pittsburgh

OPENING the regular technical season for the Pittsburgh Foundrymens Association, Lieut Col. Ralph L. Dunckel, chief of the industrial division, Pittsburgh Ordnance district, outlined the job the foundry has been doing in aiding the war effort and sketched the probable part to be played by cast metals in the period from now to the war's end.

E. C. Buerkle, retiring president, introduced to the membership its new president, Harry Kennedy. Assuming the chair, Mr. Kennedy expressed his thanks to the 100 members and guests present for the honor accorded him.

Two government movies, "Men of Fire" and "Black Cats," were provided by the Army's industrial incentive section. The first film is intended to improve the manpower situation in the foundry industry. It is a morale-building job, aimed for showing to the workers in foundries. "Black Cats" describes the Navy's night patrol in Pacific airlanes using black-painted Catalina flying boats.

Describing the excellent performance of high strength castings in ordnance items, Colonel Dunckel indicated that the unusually high requirements of army specifications are now paying off in lives saved on the battle lines. Although many foundries have had considerable difficulty in producing suitable castings, they will probably benefit from this experience in that they will be better equipped to promote the use of castings for many applications after the war which formerly required other fabricating methods because of the physical requirements.—*R. L. Hartford*

Northeastern Ohio

AT THE second meeting of the year Oct. 12, held in the Cleveland Club, approximately 125 members and guests of the Northeastern Ohio Chapter A.F.A. heard a highly interesting discussion of the world of sport by Ed Bang, sports editor, *The Cleveland News*, and an equally interesting and technical discussion on the subject of "Induction Melting Furnaces" by Frank T. Chestnut, secretary Ajax Electrothermic Corp., Trenton, N. J.

In his usual mild, modest and self deprecating manner L. P. Robinson, chair-

(*Continued on page* 142)

MICHIANA PICNIC: Some of the 200 participants in the annual picnic of the Michiana Chapter, A.F.A., held Sept. 16 at the Christiana Country Club, Elkhart, Ind. Photos courtesy of R. E. Schalliol, American Foundry Equipment Co.

modern steels win wars... build for peace!

EQUIPMENT and experience accumulated by the steel industry in peacetime proved to be tremendous assets for a nation at war. They gave us a running start.

Approximately $1,063,000,000 in Government funds were invested during wartime expansion. The industry itself spent $1,151,000,000 in expanding and modernizing—matched the Government dollar for dollar.

The iron-ore industry achieved a miracle of wartime production.

Lake ore fleets set records.

Pig iron production was pushed to the utmost.

A shortage of scrap was averted.

The industry had a brilliant corps of metallurgists who were able to solve seemingly insoluble problems. One by one each of the important alloy materials—chromium, cobalt, manganese, molybdenum, nickel, tungsten, vanadium—became hard to get in adequate quantities. Whole new families of steels were conceived around conference tables in the offices of American Iron and Steel Institute.

The new steels, known as NE (National Emergency) steels, while economical in their use of alloys, are in no sense an "ersatz" product. The first two series of such steels, announced early in 1942, were as strong as standard alloy steels having four times as large an alloy content.

Conservation was accelerated when technical committees reported on certain hardening agents which contain such elements as boron, titanium, or zirconium. These cut down the amount of alloys required.

Practically all important parts of military equipment are made of alloy steels. Modern guns, small arms, armor, projectiles, airplane engines, aircraft fuselage tubing, and even helmets are almost entirely alloy steel.

Military applications required combinations of strength, hardness, ductility, and fatigue resistance not duplicated by any of the standard peacetime steels.

Not once has any war plant had to shut down for want of steel.

The steel industry of the United States is proud of its contribution to victory; and some of the alloy steels thus produced for the first time, some of the new methods of treating and fabricating steels, to make submarine skins, airplane wing coverings, or armor-piercing shot, are likely to be useful long after the war is over.

* * * * *

The foregoing paragraphs are condensed from an admirable recent pamphlet, "Steel's War Record," issued by the American Iron and Steel Institute, to which acknowledgement and compliments are offered by the Molybdenum Corporation.

AMERICAN Production, American Distribution, American Control—Completely Integrated.
Offices: Pittsburgh, New York, Chicago, Detroit, Los Angeles, San Francisco, Seattle.
Sales Representatives: Edgar L. Fink, Detroit; H. C. Donaldson & Co., Los Angeles, San Francisco, Seattle.
Works: Washington, Pa.; York, Pa.
Mines: Questa, N. M.; Yucca, Ariz.; Urad, Colo.

MOLYBDENUM CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.

MCA

(*Continued from page* 140)

man of the entertainment committee announced that preparation for the annual Christmas party was well in hand for Dec. 14 in the Rainbow Room of the Carter Hotel. As the capacity of this room is limited to 1000, he suggested that it might be a good idea not to wait until the last minute before purchasing tickets.

Following a brief historical description of the origin and development of the induction type melting furnace, illustrated by slides showing construction and characteristic features, Mr. Chestnut pointed out that only two types have been continuously successful. His subsequent discussion was confined to these two, the submerged resistor furnace and the high frequency furnace. He presented a comparison of advantages and disadvantages of the two types, including cost of operation on various types of metal. He claimed that the high frequency furnace combines substantially all the qualities of the submerged resistor furnace and has many additional advantages. Except for first cost and slightly lower efficiency these factors would make it the ideal furnace for almost all metal melting.

In summarizing his paper he said that an electric furnace is justified where the metal to be melted is of a fussy analysis and where the quality must be kept high. Choice of a furnace is determined by the economics of a particular set of con-

(*Continued on page* 145)

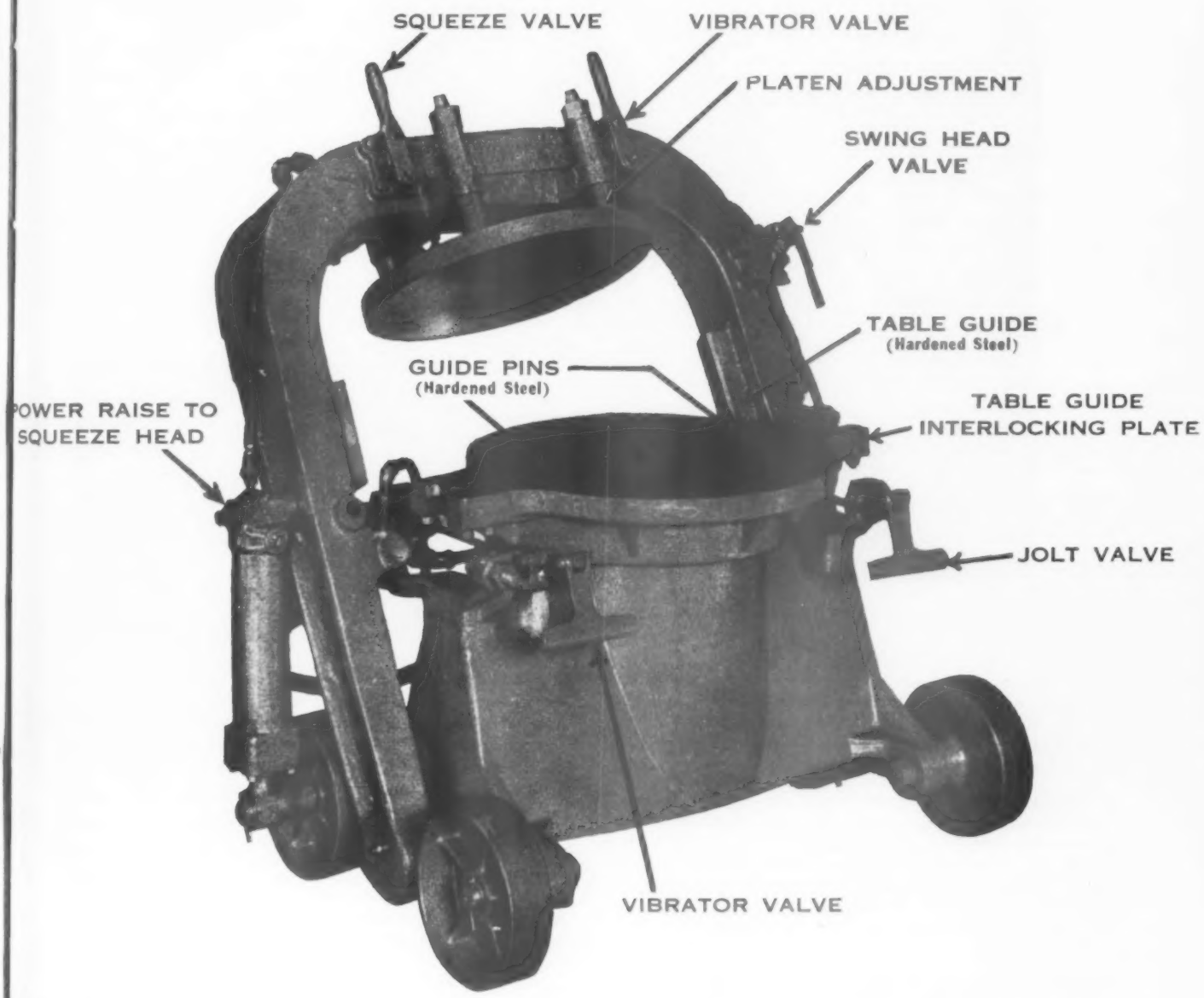
BIRMINGHAM FOUNDRYMEN, totaling 450 members and friends of the Birmingham chapter, A.F.A., turned out for the group's eleventh annual outing at the Roebuck Club, Sept. 9. The group shown at the bottom includes the officers and committeemen who helped to promote the affair. These are, left to right: R. L. Ogden, American Casting Co.; Howard A. Nelson, Hill & Griffith Co.; Gale Erwin, Republic Steel Corp.; T. H. Benners Jr., Woodward Iron Co.; Henry Noble, American Cast Iron Pipe Co.; R. A. Donaldson, Woodward Iron Co.; Fred K. Brown, Adams, Rowe & Norman Coal & Coke Co.; Joe T. Gilbert, Stockham Pipe Fittings Co. Shown again at the top center are Messrs. Brown and Gilbert, secretary-treasurer and chairman, respectively, of the chapter. Photos courtesy of J. P. McClendon, Stockham Pipe Fittings Co., and publicity chairman

INTERNATIONAL

14" TYPE JS-7 JOLT SQUEEZER

14" Squeeze - 5" Jolt
Ramming Height 26"

Outside Length of Flask Overall - 32"
Adjustment of Platen 10" to 16" Depth



All Valves poppet type for quick replacement of parts
All Guide Pins and Bushings of Hardened Steel
One Piece Squeeze Head Keeps Alignment

Automatic Lubrication to Jolt, Squeeze and Push Cylinders
Jar Table and Squeeze Platen can be made to fit any job
Portable or Stationary with Rectangular or Round Table

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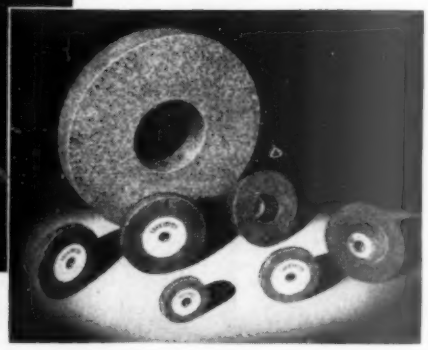
LETS RING IT AGAIN!



Every Sterling Grinding Wheel We Make Is Dedicated To Limitless Progress In A Free, Unshackled America

The character of any nation is determined by the home life of its people. Happy families build prosperous nations. It works the other way, too. Government, by the kind of laws it creates, can greatly influence the character and future of every family.

In German-dominated countries, certain restrictions prevented heads of families from obtaining work except in government approved industries. Pay was not based upon ability, but upon edict. Imported labor in Germany is almost literally chained to the job, and regimentation on every side controls the destinies of everyone. People do not vote, or if they do, the result is controlled by the "higher ups".

America needs to be watchful in order that its heritage of freedom be kept inviolate. Just because the election is over is not an excuse for any of us to relax our vigilance. The laws which Congress will consider during the coming months will effect every family—you, your wife, your children! Many changes in our laws are necessary and will be made if enough Americans demand them.

The economic future of America will benefit greatly by a minimum of government control. The problems of production, materials, and distribution can readily be solved by all of us working toward a common goal. Together, we can start peacetime prosperity on the march and build for the American family the future it deserves.

The Liberty Bell—let's ring it again!

• STERLING ABRASIVES •

THE STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY

(*Continued from page* 142)

ditions, including the stand-by charge for power, volume of metal to be melted, length of the working day, type of metal, life of involved refractories, cost of labor and the willingness or unwillingness of labor to work under different foundry conditions.—*Pat Dwyer.*

Wisconsin

APPROXIMATELY 350 members and guests of the Wisconsin Chapter of the A.F.A. participated in the sectional round-table discussions which comprised the technical program of the season's first meeting Sept. 15 at the Schroeder Hotel. Harry E. Ladwig, president of the chapter, presided.

After the dinner and general meeting, the gathering broke up into six groups. The Gray Iron section, under the chairmanship of J. V. Olle, Motor Castings Co., Milwaukee, had as its speaker Kenneth Geist, Allis-Chalmers Mfg. Co., who discussed "Carbon Equivalents." W. A. Hambley, Allis-Chalmers Mfg. Co., assisted in the discussion. Mr. Geist showed a number of charts illustrating the effect of various sections, from ½-inch to 6 inches, on tensile strength, hardness and microstructure with relation to carbon equivalents. These curves are of special practical value to show variations of tensile strength with section in comparison with test of standard test bars. Results show that with proper cupola control carbon equivalents held constant will produce uniform physical properties.

The Malleable section had as its subject "Modern Methods of Setting Piece Work Rates in Foundries," with Robert V. Osborne, Lakeside Malleable Castings Co., Racine, acting as chairman and R. H. Ruhl and C. F. Carney of Steven, Jordan & Harrison Inc., the speakers. It was brought out that time study makes for fewer erros in setting piece rates and provides a more comprehensive basis for figuring accurate costs of the castings produced. Emphasis was placed on the proper methods of approach in installing a piece rate system so that a minimum of difficulty will be met in its effective operation.

Other sections and their discussion subjects included: Nonferrous, "Casting Problems" by William Romanoff, H. Kramer Co., with John Wiltzius, Nordberg Mfg. Co., Milwaukee, chairman; Pattern, "Design of Pattern Equipment for Core Blowing Machines" by Carl Dahm, Pyle Pattern Works, and Ernst Sutter, Allis-Chalmers Mfg. Co., with A. E. Pfeiffer, Allis-Chalmers, chairman; Technical, "Methods of Sand Testing" by H. C. Stone, Belle City Malleable Iron Co., Racine, and Edward A. Janke, Nordberg Mfg. Co., with Carl R. Loper, Allis-Chalmers, as chairman.

At the pattern sectional meeting, devoted to the subject of core blowing and participated in by more than a hundred persons, Mr. Pfeiffer gave a brief talk on operation of core blowers. Mr. Dahm then carried on with the discussion. He pointed out that in constructing core boxes it is best to determine first if they are to be blown since they must be stronger if used for hand work. Steel-faced coreboxes are expensive but result in savings when repairs are necessary. Loose pieces in boxes should be made heavy for easy drawing.

Further discussion included the use of wood boxes on blowing machines, relative merits of magnesium and aluminum for pattern equipment, chrome plating of patterns, and cast iron coreboxes.—*Walter Gerlinger, chairman, publicity committee.*

Ontario

FOLLOWING an established custom, opening meeting of Ontario Chapter, A.F.A., at the Royal Connaught Hotel, Hamilton, Friday, September 29th, 1944, was devoted to personnel problems of the foundry industry and particularly to the methods which must be adopted to secure suitable new workers in the foundry. Chapter Chairman, R. T. Robertson, International Harvester Co. of Canada, Ltd., presided, with D. O. Davis, Dominion Foundries and Steel, Ltd., as chairman of the three addresses.

Introducing the subject, Joe Sully, Sully Brass Foundry, Ltd., and a national director of A.F.A., spoke on "Looking Ahead in the Foundry Industry." He was followed by H. Mabson, Chief Inspector, Industrial Accident Prevention Association, who discussed "Safety as a Factor in the Foundry Labour Problem." Final speaker in this interesting forum was F. J. Wells, International Nickel Co., Detroit, and national vice-president of the A.F.A., who talked on "New Blood in the Foundry Industry" or "Foundrymen for the Future."

Mr. Sully made a special plea for better co-operation between labor and management. He also discussed briefly factors of cost, sales and plant conditions that enter into the labor management picture.

Mr. Mabson referred to the unfortunate but general impression that the foundry is a dirty, hard, unhealthy, place in which to work where little attention is paid to safety. He emphasized the steps that could be taken readily in every plant to improve housekeeping and referred to the Safety Code of A.F.A. as an excellent guide. The major part of his address was concerned with silicosis, which is providing all too good a background for the idea that the foundry is unhealthy. With reference to the incidence of silicosis in foundries in Ontario, it was shown that blasting operations had been eliminated as a danger factor. Principal sources of dust at present are the use of powder partings, particularly where not applied carefully and the shake-out. Removal of dust is comparatively simple where the shake-out can be centralized but where shake-out must be performed on the floor, it is necessary to resort to general ventilation removing sufficient air from the plant to keep the dust concentrations below the danger level.

Mr. Walls emphasized the need of the foundry industry for a greatly improved programme of public relations and education of management and employes. He indicated that better public understanding of the foundry industry might be developed through talks before groups, motion pictures, literature for general distribution, and trips through foundries. For the development of prospective foundrymen, it is necessary to secure the inclusion of foundry work in schools and as a hobby for youth groups.

Philadelphia

PROGRAM committee of the Philadelphia Chapter, A.F.A., under the capable chairmanship of E. C. Troy has an ambitious schedule arranged for coming months. It is planned when having a very theoretical speaker to have a practical technical chairman, and vice versa. The tentative schedule follows:

Nov. 10—Norman Tisdale, Molybdenum Corp. of America, "Boron in the Foundry Industry;" technical chairman, Werner Finster, metallurgist, Reading Steel Casting Co.

Dec. 10—"Information Quiz." This meeting will feature three experts on steel, iron and nonferrous metals who will attempt to answer all questions.

Jan. 12—"Ajax Nite."

Feb. 9—John Juppenlatz, chief metallurgist, Lebanon Steel Foundry, "Non-Destructive Testing;" technical chairman, Phillip DeHuff, metallurgist, Westinghouse Electric & Mfg. Co.

March 9—Fred G. Sefing, International Nickel Co., "A Study of Molding Methods for Sound Castings."

April 13—Walter Giele, Walter Giele Co., "Mechanical Handling of Foundry Materials."

May 11—Dr. J. T. MacKenzie, chief metallurgist, American Cast Iron Pipe Co., "Centrifugal Castings."—*B. A. Miller.*

St. Louis

THE newly-elected president, Eugene Ballard, National Bearing Metals Co., presided at the monthly meeting of the St. Louis District Chapter of the A.F.A., Oct. 12. Attendance totaled 88, and subject of the evening was "Dilatometer Study on Sands."

Henry Meyer, General Steel Castings Corp., Granite City, Ill., described the castings made at his plant, ranging in size from 100 to 120,000 pounds, and discussed the comparative value of various molding sands as well as their reaction after bentonite and cereal additions.

Gene Conreaux, American Steel Foundries, Granite City, Ill. discussed core sands, touching on variation of hot strength throughout soaking periods, maximum hot strength of core sand mixes when used at various high temperatures; effect of moisture-baking time and temperature on maximum hot strength, effect of increased moisture and its influence on required baking time and temperature to obtain maximum hot strength, effect of baking time and temperature on gas content, and effect of cereal binder

on hot strength. A discussion period followed.

St. Louis Chapter of the A.F.A. held its initial meeting of the 1944-45 season Sept. 14 at the DeSoto Hotel. The chapter turned out a better than average attendance to hear H. R. McCoy, chief metallurgist, Ohio Steel Foundry Co., Lima, O., discuss "Basic Principle Followed in the Development and Production of Cast Steel Breech Rings." Mr. McCoy's talk on this important piece of ordnance which formerly was made from forgings proved most interesting.—*Charles E. Rothweiler, secretary-treasurer.*

Ontario

TWO hundred and five members and guests turned out at "Barnesdale" for the annual picnic of the Ontario Chapter of the A.F.A., on Saturady, Aug. 26. The weather favored the event and as a result not only the attendance but the participation in all the games and events reached new heights.

Because of the crowded condition of available golf courses, it was necessary for the golfers to start their game at Dundas Golf Club in the morning. This, however, proved to be an excellent innovation, since it enabled the whole crowd to assemble at "Barnesdale" by the middle of the afternoon. There the usual A.F.A. sports program was run off with horse-shoe pitching, shooting and darts, and the addition of volley ball and one or two special games.

Everyone voted the picnic an outstanding success and the thanks of the chapter were expressed to Russell Woods, Gavin Young and Rolph Barnes who carried out most of the arrangements, and again to Rolph Barnes for the use of his estate, and to all the firms that contributed so generously to the affair.—*G. L. White, secretary-treasurer.*

Southern California

THE Southern California Chapter of the A.F.A. held its first dinner meeting of the winter and fall season, Sept. 22 at the Elk's Temple, Los Angeles, with a large number of members and guests present.

The last previous meeting was held in June when the newly-elected officers for the 1944-45 season were installed. Social activities of the season culminated in the August annual picnic and stag party.

The meeting was called to order by the new president, W. D. Bailey, Jr., Westelectric Castings Inc., who made a brief report of the first A.F.A. annual contact conference held at the Palmer House, Chicago, Aug. 26. He stated that the interest of the group was held throughout the entire day and evening, and the discussion at this round-table will be of tremendous value to the chapters in the coming years.

Following the introduction of new members and visitors present, the topic for the evening's discussion, "Foundry Sands," was led off by Leonard Hoffsteter, Brunley-Donaldson Co. Mr. Hoffsteter made the subject an interesting one describing in detail the various qualities of different types of foundry sand and the adaptation of various characteristics of sand to production of different types of castings.

Following the discussion, a motion picture produced under government supervision and titled "Men of Fire" was shown.—*Luther Whiteman.*

Quad-City

FIRST meeting of the season for the Quad City Chapter of the A.F.A. was held Sept. 18 at Fort Armstrong Hotel, Rock Island, Ill., with 65 members and guests present. Newly-elected chairman, R. E. Wilke, Deere & Co., Moline, Ill., presided and gave a brief report on the Chicago meeting of all chapter chairmen and mentioned the organization of new national committees. Dinner was followed by showing of "Quail Away" a color film describing the hunting season.

Harry W. Dietert, Detroit, discussed "Mold Gases and Mold Atmosphere Control," accompanying his talk with a color film illustrating penetration of various metals into the core during the pouring operation and while castings are cooling. The effects of different atmospheres were shown, and the advantage of an atmos-

(*Concluded on page* 148)

CALIFORNIA WARBLERS: Annual summer stag of the Southern California Chapter of the A.F.A. held at Long Beach, Calif., Aug. 5, found Pete Valentine of Del Monte Sand, San Francisco, on hand as usual with his song books and music. Left to right: John Kanoff, Pete Valentine, Nels Anderson and his brother, Bert Popperwell, Dick Hughes, Dan Borzage and Charles Jurack. Below is shown the tug-of-war, ferrous vs. nonferrous teams. Photos courtesy of R. H. Hughes, Almquist Bros. & Viets, Los Angeles

(The Foreman)

"I wonder how long these fellows 'll last". .

(A couple of days later)

"They've taken to the SPOs like ducks to water and are producing good molds like old timers already!"

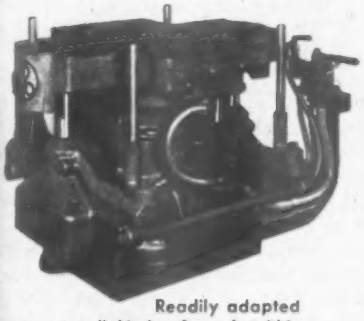
Adaptable to quick pattern change; handles broad range of short run work profitably.

That's characteristic of the SPO Molding Machines pictured on this page—and of the line as a whole. Beginners really *do* "catch on in a hurry." Your men are happy; so is the foreman.

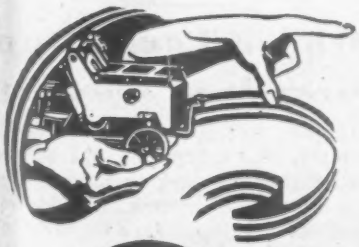
Extreme simplicity makes SPOs easy to master. When war came, their "ABC design" needed no overhauling to get under a vastly increased load very quickly. Fast, modern and flexible, they are readily adapted to many special individual requirements; a slight change here or there does it. SPOs excel alike on short jobs and on long production runs.

You can pair up either stripper series shown here with either rock-over series, giving you the *one right* cope-and-drag combination that suits your demands. These "doubles" are typical of many that are possible with SPO Molding Machines.

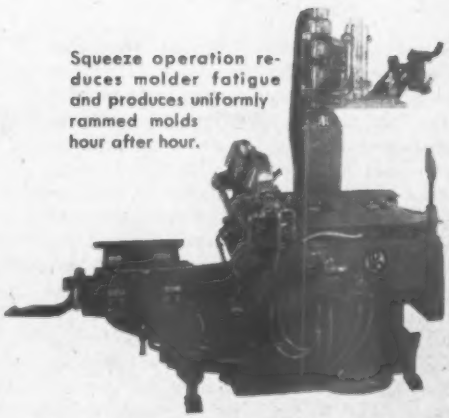
Bulletins giving capacities of all these machines upon request



Readily adapted to all kinds of work within capacity of machine. Suited especially to production work in steel foundries.



Squeeze operation reduces molder fatigue and produces uniformly rammed molds hour after hour.



On short and long runs alike, a speedy producer of drag as well as cope molds.

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Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

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(*Concluded from page* 146)

phere consisting of nitrogen or natural gas for prevention of penetration was stressed. Mr. Dietert made a splendid coverage of the various types of facing materials and predicted that eventually they will be produced in more concentrated and purer form. An interesting discussion period followed illustrated by slide films. —*H. L. Creps, secretary-treasurer.*

Western New York

REGULAR monthly meeting of the Western New York Chapter of the A.F.A., held Oct. 6 at Hotel Touraine, Buffalo, had an attendance of approximately 80 members and guests. Chairman Reinhold D. Loesch presided.

Frederick G. Sefing, International Nickel Co., New York, in his talk "Where Can Education Be Used in the Foundry?" stressed the importance of better education of workers, foremen and management to meet the need for sound clean castings. Workmen skilled in the knowledge of pyrometer reading and handling of mechanical equipment, sand control, alloy castings, microstructure studies and specifications are required and management must understand the human element problems in putting the right man in the right job. To meet the transition period from individual artistry to scientifically engineered industry co-operation between worker and employer is necessary. In closing Mr. Sefing stated that the future of the foundry industry lies in elevating the mental stature of all foundry personnel by education, from the president down to the laborer. A discussion period followed.

The next meeting will be held at Hotel Touraine Nov. 3 with Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va. discussing "Today's Cupola Operation and Scrap."—*J. Ralph Turner, secretary.*

Michiana

ANNUAL picnic of the Michiana Chapter of the A.F.A., held Sept. 16 at the Christiana Country Club, Elkhart, Ind., attracted an attendance of about 200 members and guests to what was voted one of the most enjoyable of such gatherings ever held by the group.

A full day's program was provided of golf, softball, bait casting and other games and contests, followed by a fine dinner and floor show in the evening. W. V. Johnson, Oliver Farm Equipment Co., South Bend, Ind., headed the committee in charge of arrangements, assisted by V. C. Bruce, Buckeye Products Co., Elkhart, the chapter chairman.—*Carl W. Petersen, Dodge Mfg. Corp.*

New England

OPENING meeting of the season for New England Foundrymen's Association was held Sept. 13 at the Engineer's Club, Boston, Mass. A roundtable discussion, led by Charles Burkart of the Framingham Foundries Inc., Framingham, Mass., and entitled, "Modern Cupola Melting," outlined melting practices with particular reference to use of steel in the cupola. The meeting was thrown open for general discussion, the members participating in the question and answer period.—*Merton A. Hosmer, vice president.*

GRAY IRON OPERATORS

Hold Quarterly Meeting

THE 15th quarterly meeting of the Operator's group of the Gray Iron Research Institute Inc., was held in Chicago, Sept. 14-15, under the chairmanship of H. C. Winte, Worthington Pump & Machinery Corp., Buffalo. A new attendance record was established by the 56 foundry superintendents, metallurgists and foremen representing 14 member foundries from 10 states.

The first day's meetings, held in the Bismarck Hotel, were devoted to roundtable discussions covering important foundry problems such as cupola patching, foundry coke, ladle inoculants, foundry records, and castings defects. Discussion leaders included R. Hageboeck and O. Woehlke, Spring City Foundry Division, Grede Foundries Inc.; C. Morken, Carondelet Foundry; H. C. Winte, Worthington Pump & Machinery Corp.; and D. E. Krause and Tom Barlow of Battelle Memorial Institute.

The evening meeting featured E. B. Sherwin, president, Chicago Hardware Foundry Co., who discussed, "The Role of Research in the Foundry." He pointed out that the foundry industry required organized research in order to progress and hold its place in industrial development of the future. Furthermore, such research must be of two different, although sometimes overlapping, types. These types he defined as revolutionary or long-term research and evolutionary or short-term research. The short-term research should include study of those subjects having an immediate bearing on the economy, speed, and quality of present-day production. The longer type of study would and should be aimed toward developing materials markedly superior to anything known at the present time.

It is foolish to believe that because gray cast iron has changed from a brittle material of 20,000 pounds per square inch tensile strength to a rather shock-resistant material of 60,000, 70,000, or perhaps 90,000 pounds per square inch tensile strength, it will not continue to be improved. Only organized and carefully conducted research, however, can find the cast iron of the future effectively. Lucky discoveries have played a very small part in the development of gray cast irons as they exist today, and it is logical that they will play even a more minor role in the future.

During the second day of the meeting, the operators were guests of the Chicago Hardware Foundry Co., where they were invited to examine the foundry operation. A great deal of interest was shown in the new cupola features designed by the Gray Iron Research Institute staff and constructed by the Chicago Hardware Foundry Co. They were impressed by the improved coke ratio and spout temperatures which have been the result of "evolutionary research."

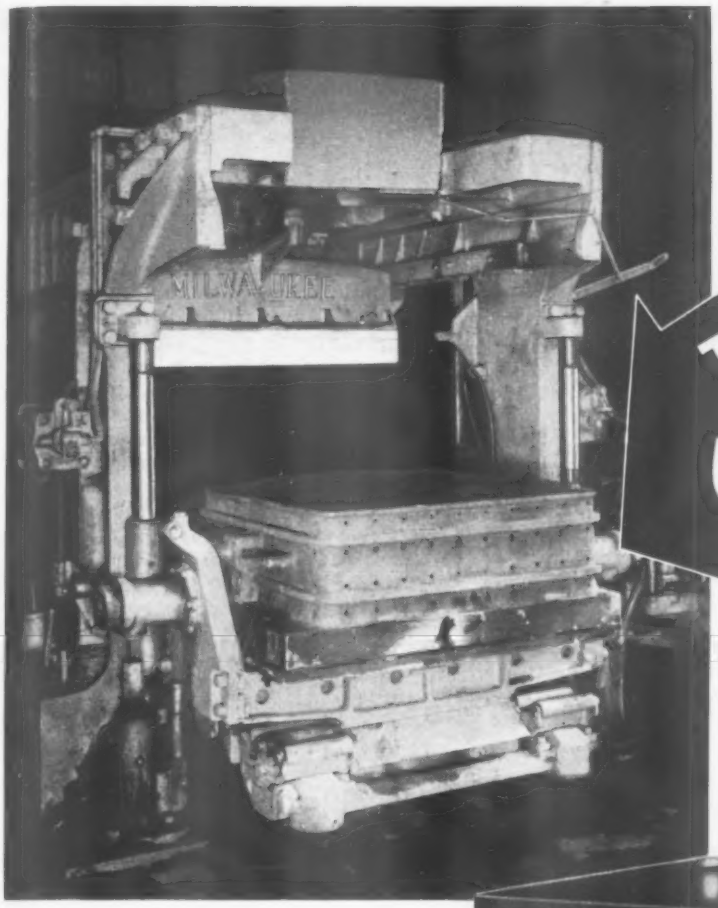
Later in the day, the operators expressed their opinion of the various subjects which should be studied as part of the research program for the coming year. The next meeting was set for St. Louis in December of this year.

Airbrake Marks 75th Anniversary

To the world of transportation the Westinghouse Airbrake, invented 75 years ago, made the modern railroad train of 100 or more cars, a possibility. The oldest living Westinghouse employe, Tom Campbell, 93, who lives in East Liberty, Pa., remembers the incident which was responsible for his affiliation with the company. An apprentice molder in a small foundry and machine shop, he recalls that Westinghouse, founder of the company, brought in some drawings of the airbrake. Mr. Campbell was assigned to make the brass castings for the new airbrake, and upon completion of his apprenticeship, he learned that Westinghouse had begun the manufacture of the new appliance and was selling it to railroads all over the world. Mr. Campbell joined the new company and has been associated with it 74 years, 51 years actively and 23 years as a pensioner.

Draper Corp. Buys Gray Iron Foundry

Draper Corp., Hopedale, Mass., builder of textile mill equipment, has acquired through purchase the Framingham, Mass., gray iron foundry owned jointly by B. F. Sturtevant Co., Boston, and Niles-Bement-Pond Co., Pratt & Whitney Division, Hartford, Conn. The plant, consisting of five buildings on a 10-acre site, has a capacity of 100 tons a day which will be added to the Draper capacity for castings. The Framingham shop originally was owned by the Ames Plow & Shovel Works. Willett, Sears Co. later operated the foundry which in 1919 was acquired by B. F. Sturtevant Co. The latter sold a half interest to Pratt & Whitney Division, April 1, 1942.



TAKES A 60,000 lb. SQUEEZE

Sterling Flasks Used on Huge 30 Ton Milwaukee Rollover Machine Easily Withstand Tremendous Pressure!

HERE is a typical example of Sterling ruggedness and enduring strength to resist distortion. Sterling Style 3/8 NT Flasks, illustrated above, are being used in connection with a well-known mid-western steel foundry's big rollover machine. Although subjected to as much as 60,000 lbs. pressure, these sturdy Sterlings continue to take the punishment, day-in and day-out, and come back for more.

Sterlings are all-steel, all-welded foundry flasks with solid center reinforcing ribs, square flanges and full-width bearing . . . the preferred flasks in more than 3500 American foundries.

(Patent No. 1974292)

Sterling FOUNDRY FLASKS

STERLING WHEELBARROW COMPANY • MILWAUKEE, WIS., U. S. A.

A 4520-1P

NEW EQUIPMENT & SUPPLIES

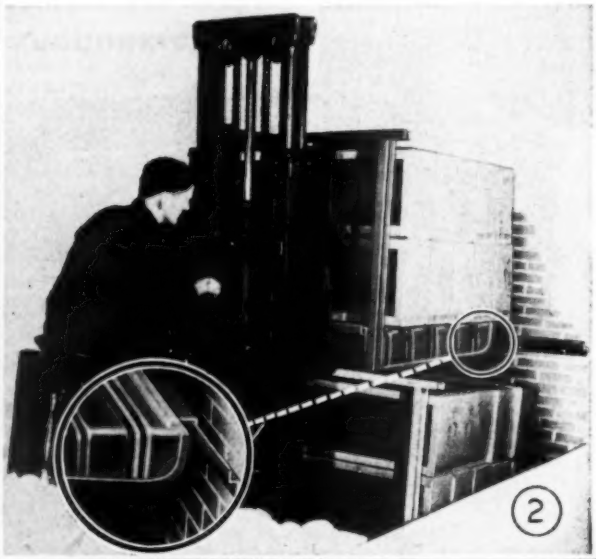
(1)—X-Ray Tube: Matchlett Laboratories Inc., Springdale, Conn., has perfected a precision x-ray tube that operates at two million volts. For the first time this tube makes it practical to inspect by x-ray exceedingly thick sections of metal. In a particular instance the exposure has been reduced from a week with 1,000,000 volts, to less than an hour with 2,000,000. It is claimed this powerful new precision tube brings to the field of x-ray radiography the same sort of improvement in definition that the electron microscope, compared with the standard microscope, has brought to the field of optics.

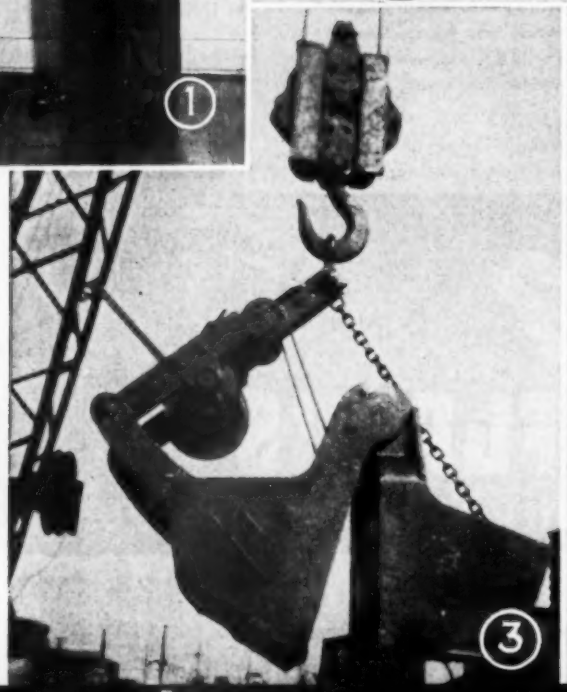
(2)—Skid Platform: Union Metal Mfg. Co., Canton, O., announces a new skid platform with interlocking channels and vertical end frame for handling frangible materials and those with finished surfaces that would be damaged in stacking. A channel welded to one lip of the skid engages a Z-bar. The other end has a channel welded under the lip of the skid with the channel inverted. This end also has a vertical end frame. It is claimed these skid platforms can be tiered as high as the lifting mechism of the fork or platform lift truck will take them.

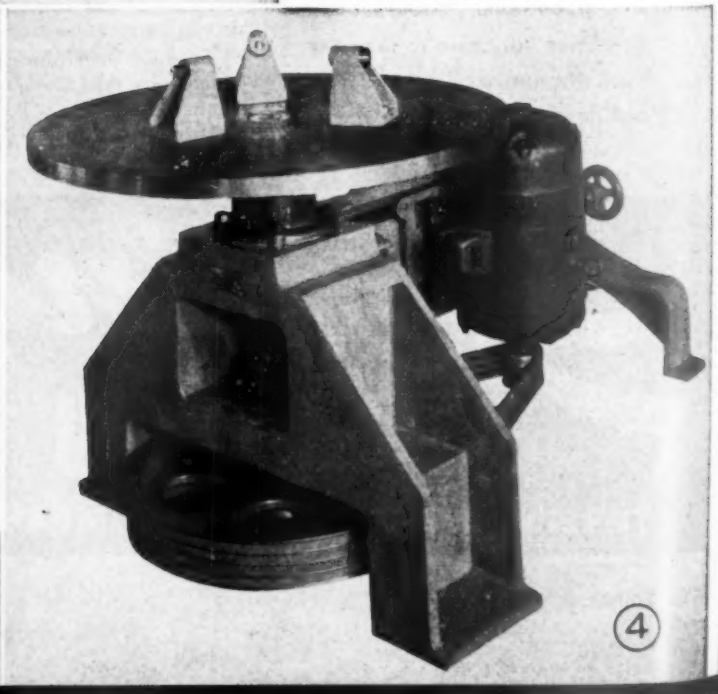
(3)—Bucket: M. P. McCaffrey Inc., 2121 East Twenty-Fifth Street, Los Angeles, has designed a single-line clam-shell bucket especially intended for use where limited head room is available. The unit illustrated, designed for installation in the foundry of the Kay-Brunner Steel Products Inc., Alhambra, Calif., has ½-yard capacity, but the bucket can be made in sizes from 3/8-yard to 2 yards. Low head room feature of the bucket is obtained by building the opening and closing mechanism on one side. Control, which includes a spring winder with brake when the bucket is opened manually and automatic release which works by gravity when the bucket is set down, is built into an elbow setting out from the side of one scoop. The opposite scoop is supported by chain to the eye of the bucket. The bucket closes into 3 feet of space, opens to 5 feet and can be operated in 8 feet of head room.

(4)—Casting Machine: Wm. Loeffler Machine Co., Sheboygan, Wis., has developed a centrifugal casting machine with a 46-inch table which will take up to a 38-inch round flask. The machine, which is of the vertical type and shown in the accompanying illustration, is equipped with a 3-horsepower motor. Spindle drive is through 6-groove v-belt and pulleys and operates at 75 revolutions per minute. Increase in speed can be secured by use of a larger pulley on the motor shaft, and adjustment is provided on the motor slide for proper belt tension. Table spindle is mounted in self-aligning roller bearings. Weight of machine is approximately 2380 pounds, and the table may be drilled to suit user's requirements.

(*Continued on page* 154)

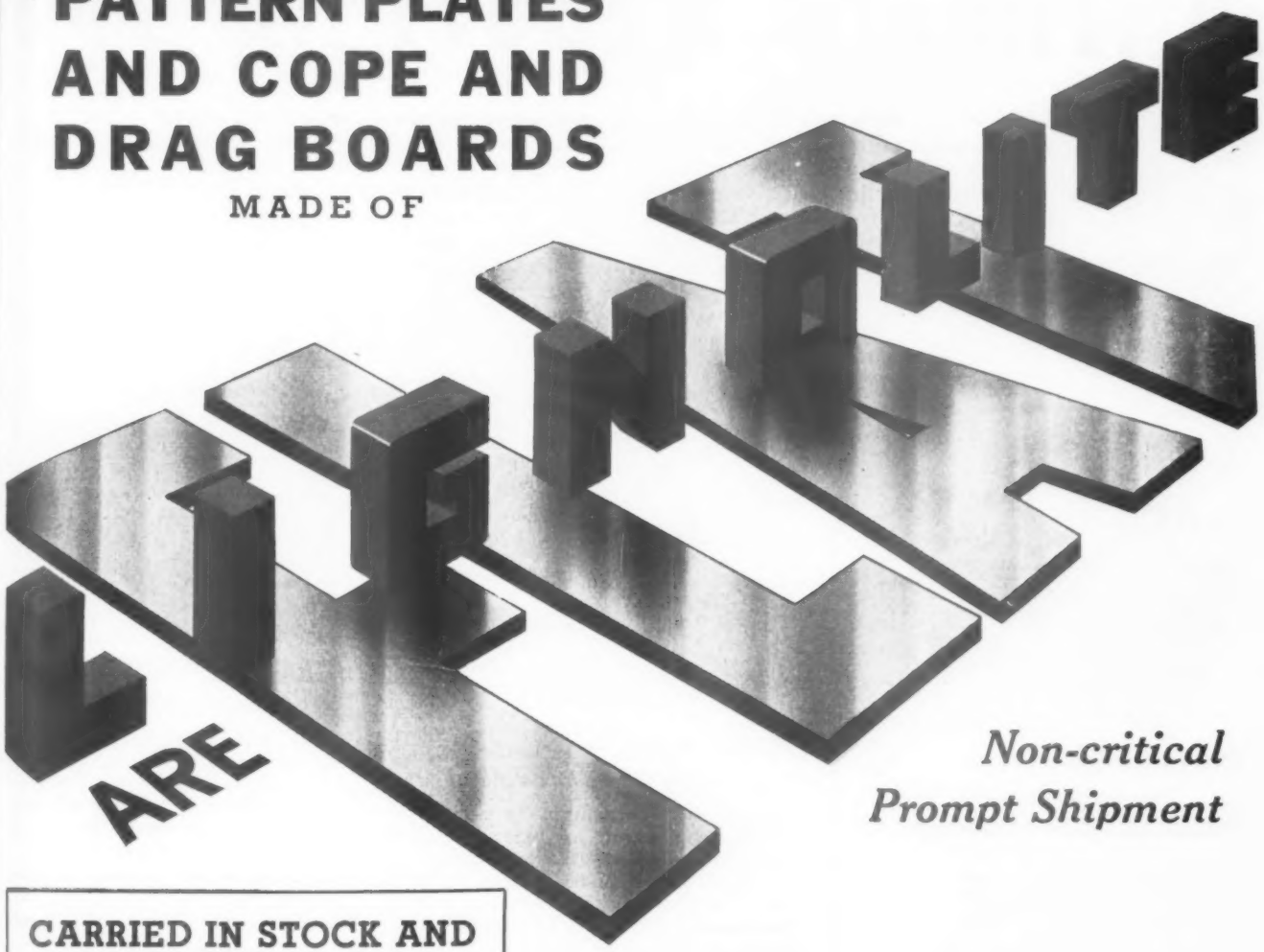






PATTERN PLATES AND COPE AND DRAG BOARDS

MADE OF



Non-critical
Prompt Shipment

CARRIED IN STOCK AND DISTRIBUTED BY

ADAMS & NELSON COMPANY
4125 Fullerton Avenue, Chicago, Illinois
BARADA & PAGE, INC.
2812 Center Street, Houston, Texas
M. A. BELL COMPANY
217 Lombard Street, St. Louis, Missouri
COMBINED SUPPLY & EQUIPMENT CO., INC.
215 Chandler Street, Buffalo, N. Y.
FREEMAN SUPPLY CO.
1152 E. Broadway, Toledo, Ohio
E. R. FROST COMPANY, INC.
1406 Quincy Street, Minneapolis, Minn.
GRANT & COMPANY
2144 E. 7th Street, Los Angeles, California
GEORGE F. PETTINOS, INC.
1206 Locust Street, Philadelphia, Pa.
WATERSTON'S
28 East Larned Street, Detroit, Michigan
WESTERN FOUNDRY SAND CO.
1039 Elliott Avenue West, Seattle, Wash.

In Canada:
GEORGE F. PETTINOS, (CANADA) LTD.
42 James Street South, Hamilton, Ont.

• They stay flat because LIGNOLITE has high transverse strength and resistance to deflection. It is impervious to moisture and does not warp from contact with wet sand or high humidity. LIGNOLITE is half the weight of aluminum, is abrasion proof, of uniform caliper, and may be easily machined, sawed, drilled, tapped. Available in all flask sizes 7/16" to 2" thick or in sheets for own cutting. Write for sample and complete information.

Mounted LIGNOLITE Pattern Plate

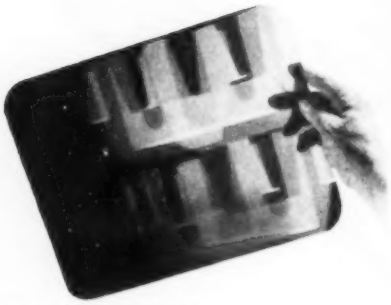
MARATHON CORPORATION

CHEMICAL DIVISION **ROTHSCHILD, WISCONSIN**

A Timely Report to the

ONE of the most rapidly growing developments in the foundry industry today is the utilization of photography in specialized applications. From engineering research and design all the way through production, training, inspection, and demonstration, functional photography is performing an increasing number of important jobs—in addition to its general use in recording gating technics, illustrating reports, copying, and other more familiar operations.

Highlighted below are a dozen of the ways in which photography is working in industry. They indicate the scope and diversification of its applications . . . perhaps will suggest how it can be applied to your business.



RADIOGRAPHY—

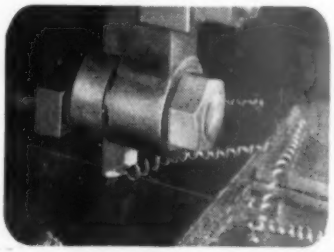
Plays a double role

Radiography's place in inspection is well known—not so familiar, but becoming increasingly more important, is the way product engineers, foundrymen, welders, and designers use radiography to improve design and production methods . . . saving time, material, manpower, and money.

PHOTO LAYOUT—

Reproduces drawings on metal

Engineering information is now transferred to metal, or other material, with photographic speed and accuracy. Where the layout is complex—or in quantity reproduction—photo layout saves time and money. Template making is one of its most important uses.



ULTRA-SPEED PHOTOGRAPHY

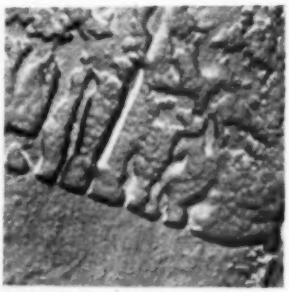
"Magnifies" time

Just as photomicrography reveals details of metal structure too small to be seen with the unaided eye, so ultra-speed photography permits the analysis of motion normally too fast to be perceived. It has helped to solve a multitude of problems involving motion.

PHOTOMICROGRAPHY—

Basic metallurgical tool

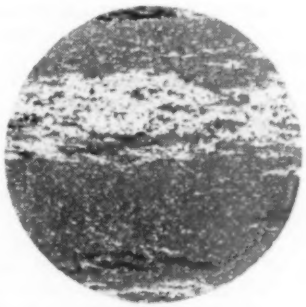
Photographs of metal surfaces—taken through a microscope, up to 3000 diameters—represent the true structure of the specimen. Photomicrography is of major importance in studying grain structure, results of heat treatment, tempering, and other operations in both research and production control.



ELECTRON MICROGRAPHY—

Magnifies 200,000 times

Direct magnifications up to 30,000 times—and photographic enlargements up to 200,000—made possible by the electron microscope, are helping to solve many perplexing industrial problems. Showing detail beyond the limits of visible light, these great magnifications open new horizons in metallurgy.



MICRORADIOGRAPHY—

Adds another dimension

The metallurgist who finds it desirable to observe the sub-surface micro-structure of metals can now do so with the help of microradiography. Details usually masked by necessary etching, such as shrinkage and porosity, and phases invisible on the metal surface, can be clearly differentiated on the microradiograph for study and reference.

FUNCTIONAL PHOTOGRAPHY...

Foundry Industry...

RECORDAK—*"Files" bulky drawings on microfilm*

Microfilming is becoming standard practice in more and more industries. Drawings, specifications—all paper records—are microfilmed rapidly and economically and stored with a 98% saving in space. Reference time is cut two-thirds with a Recordak "film-file," and full-size prints readily made.

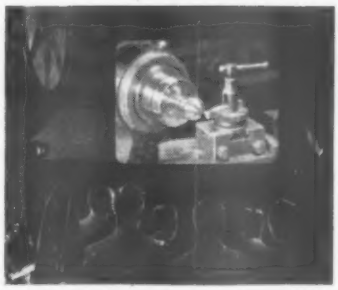
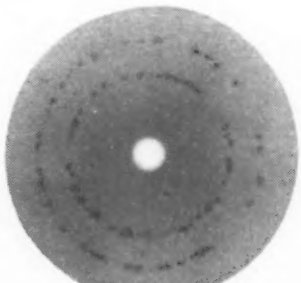


PHOTO-VISUALS—*"Know-how" by "Show-how"*

Motion pictures, slides, film strips, and photographic operation sheets and manuals have proved the most rapid and efficient means of training. In many other fields—demonstration, promotion and safety, for example—photography tells the story clearly and completely.

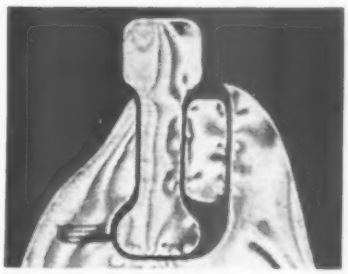
SPECTROSCOPY—*Analysis in a flash*

Fast, accurate qualitative and quantitative chemical analysis, as well as a record for reference, is provided by spectroscopy. Because analyses of even the most complex substances are obtained in minutes, irregularities in production can be avoided and losses prevented.



X-RAY DIFFRACTION—*Reveals the invisible*

Industry is finding many practical applications for crystal analysis by x-ray diffraction. Minute particles, too small to be seen by visible light, modify and diffract x-rays. Recorded on film, the x-rays form diffraction patterns which are of great value to metallurgists and engineers in the search for better materials and methods of metal-treating.



STRESS ANALYSIS—*Previews performance*

Photographic stress analysis studies, similar to the photo-elasticity illustration above, are playing an increasingly important part in product design. Study and analysis of an experimental model's behavior under simulated operating conditions enable predetermination of the product's performance.

INSTRUMENT RECORDING—*Data reporter*

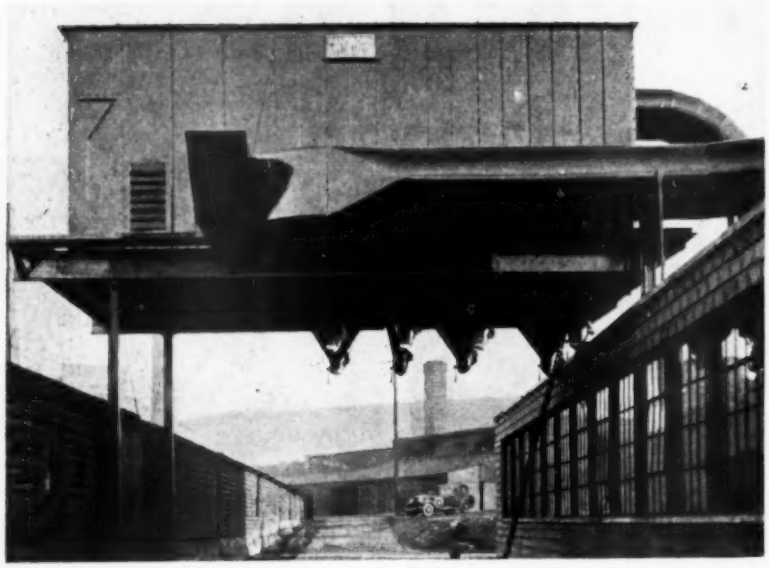
Photography is used to record transient phenomena where instrument fluctuations are too rapid for accurate visual observation—as in cathode-ray oscillograph traces; where the cycle is too long for convenience; where a number of indications must be recorded simultaneously; and generally when a record is needed for detailed study and analysis.

Functional Photography Checklist

We have prepared a checklist which will be useful in determining whether you are getting the most out of modern photography. Write to Eastman Kodak Company, Rochester 4, N. Y.

Analyzes...Improves...Records...Reproduces

Kodak



PANGBORN DUST-CONTROL SYSTEMS DESIGNED FOR

➡ ECONOMY
➡ CONVENIENCE
➡ SERVICE

When Pangborn engineers tackle your dust problems—they have three goals in mind. First your needs must be answered as economically as good engineering dictates. Next, the job must be arranged for maximum convenience, both in placing of collector and arranging for easy unloading of collected dusts. Finally, the installation must be designed to give most efficient operating service possible—overcoming all dust hazards and problems—freeing your mind of all dust worries.

NATIONAL SECURITY AWARD

ARMY-NAVY "E"

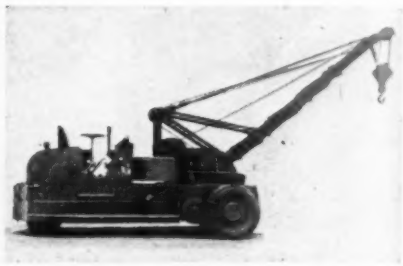
PANGBORN

WORLD'S LARGEST MANUFACTURER OF DUST COLLECTING AND BLAST CLEANING EQUIPMENT

PANGBORN CORPORATION · HAGERSTOWN, MD.

(*Continued from page* 150)

Cargo Crane: Link-Belt Speeder Corp., 307 North Michigan Ave., Chicago, has developed the model YC-9 cargo crane with special features including a 10-foot 9¼-inch wheel base, overall length 13 feet 6 inches and overall width 7 feet 6 inches. The unit is controlled and steered hydraulically. Upper machinery is mounted on a 44-inch



cast steel turntable equipped with hook rollers and oversize center pin to permit full circle operation. Telescopic boom extends from 14 to 20 feet, raised and lowered by an independent, self contained worm boom hoist. Two independent drums permit operation as a single line clamshell or two line buckets. The entire unit is operated by a three-speed transmission from a 40 horsepower gas engine, for traveling, swinging, hoisting and boom hoist. There are three traveling speeds forward and one reverse, with a low speed of 1.9 miles per hour and a high speed of 6.75 miles per hour.

Goggles: Full protection, plus the utmost in comfort, are said to be provided in goggle frames made from tenite, a plastic material supplied by the

Tennessee Eastman Corp., Kingsport, Tenn. The goggles are molded by the Vlchek Tool Co., for the Kimball Safety Products Co., Cleveland. The extra size lenses permit unobstructed vision. Lenses are interchangeable so that, if necessary, different colored lenses may be inserted.

(*Continued on page* 156)

TREBLE THE PRODUCTION OF EVERY MAN?

★HERE'S HOW!★

Do you make small, medium, or large castings in your foundry? All are important these days as are their quantity and quality.

Herman engineers have been whipping tough molding jobs for more than forty years and have developed the "know-how" that has made the name HERMAN world-famous in foundry circles. These engineers will be glad to study your molding problems and specify the size and type Machines that will best suit your requirements.

Jarring and Jarr Stripping Machines are available in any size or capacity up to 140,000 pounds. Jarr Rollover and Pattern Drawing Machines are available in a variety of sizes ranging from 750 pounds to 40,000 pounds rollover capacity in Pitless and Pit Types. Independent Rollover and Pattern Drawing Machines are also available for use with Plain Jarring Machines you may now have in operation.

Regardless of which Herman Molding Machine you choose, you are assured of highest efficiency, greatest speed, and minimum maintenance for the entire service life of every Herman. We'll be glad to discuss your problems with you.

MOLDING HERMAN MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.

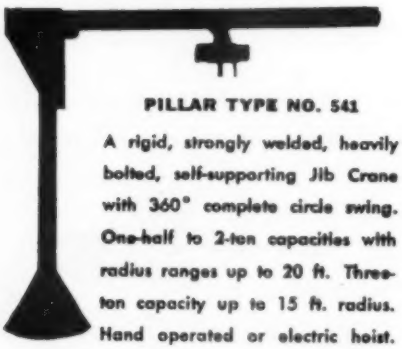
Save WITH JIB CRANES

on Point-of-Operation Jobs . . .

Stop Costly Tie-Ups of Heavy-Duty Overhead Cranes at Lighter-Duty Points of Foundry Operation!

★ Above view shows a one-man Jib Crane in action loading castings onto the rack of a heat-treating oven at a large ordnance steel plant.

Here, as in dozens of other point-of-operation jobs in the foundry, these Chicago Tramrail Jib Cranes are able to take over loads ranging from 1/2 to 3 tons, thereby releasing the overhead crane for its usually more productive heavy duty handling.



PILLAR TYPE NO. 541

A rigid, strongly welded, heavily bolted, self-supporting Jib Crane with 360° complete circle swing. One-half to 2-ton capacities with radius ranges up to 20 ft. Three-ton capacity up to 15 ft. radius. Hand operated or electric hoist.

for example:

at the "SHAKE-OUT"...

Operating at 360° complete circle swing, these nimble cranes take the load from overhead cranes which converge at the "shake-out". No costly tie-up or wear and tear of heavy duty equipment and you save man-power in the bargain.

Write today for Jib Crane circular. No obligation.

CHICAGO TRAMRAIL COMPANY

2910 CARROLL AVE. Phone KEDzie 7475 CHICAGO, ILL.

(*Continued from page* 154)

Ear Protector: Industrial Products Co., 2827 North Fourth Street, Philadelphia, has developed an ear insert for noise absorption which is said to give the following advantageous features: Reduces danger area noise to a safe level,

provides protection to the ear against flying fragments of foreign material, permits hearing ordinary and telephone conversation, worn with comfort, provides ventilation for inner ear, is sanitary, will last indefinitely, and its cost is negligible. Several sizes are available.

Electric Control: Leeds & Northrup Co., 4934 Stenton Avenue, Philadelphia 44, has developed a new type of control for electric furnaces. The new system not only regulates electric input to hold temperature at a selected control point or to a program, but is said to hold it there so dependably that users obtain the most efficient balance in product uniformity, speed of output and flexibility of operation. By means of an *On-Off* contacting system, it feeds to the heating unit the electric current needed to keep temperature to the required control point. Input is either Full-On or Full-Off. Regulation is obtained by automatically controlling the time during which current is *Off* or *On*.

Floor Cleaner: G. H. Tenant Co., Minneapolis, announces a floor cleaning machine that eliminates manual scraping, chemicals, soap and water. A heavy duty 16-inch diameter drum

type steel brush revolving at 1725 revolutions per minute, driven by an electric or gasoline motor throws bits of metal and other miscellaneous material into a built-in pan hopper. A vacuum fan sucks lighter material into the bag. A 20-gage brush is recommended for

(*Continued on page* 160)

NO FINER ALLOYS ARE MADE

Some day . . . perhaps . . . someone will discover how to produce even finer alloys. When such improvements come, you may be sure that our laboratory and research staff will promptly embody the advancements in SIPI Alloys. But today . . . regardless of how rigid or exacting your requirements may be . . . you may specify SIPI Alloys with absolute confidence, knowing that no finer quality is available.

Silverstein and Pinsof
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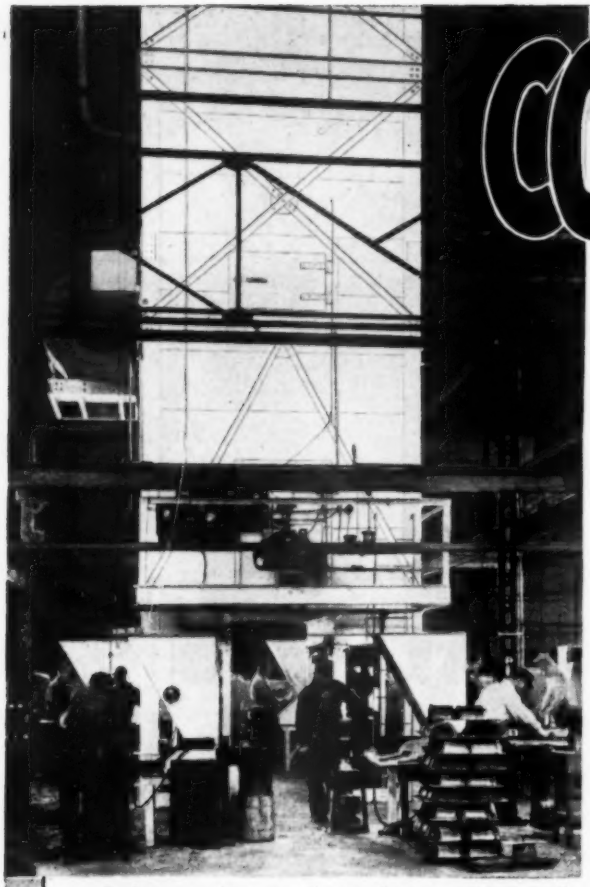
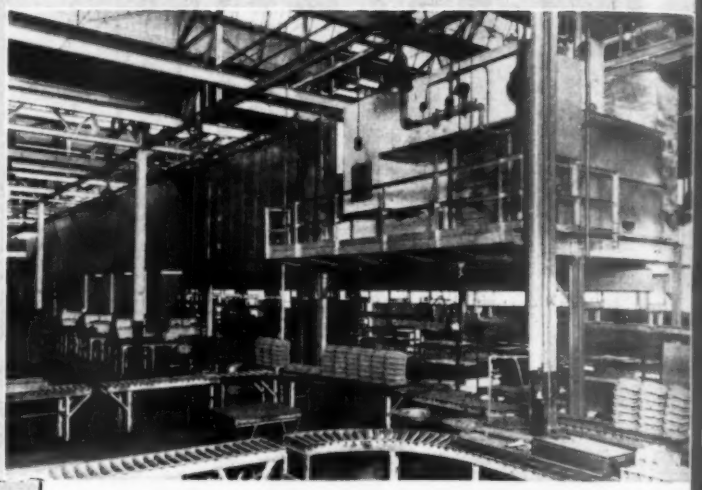
1720 ELSTON AVENUE CHICAGO 22, ILLINOIS

BRASS · BRONZE · ALUMINUM · LEAD · TIN · SOLDER · TYPE METALS · BABBITT · ZINC BASE ALLOYS

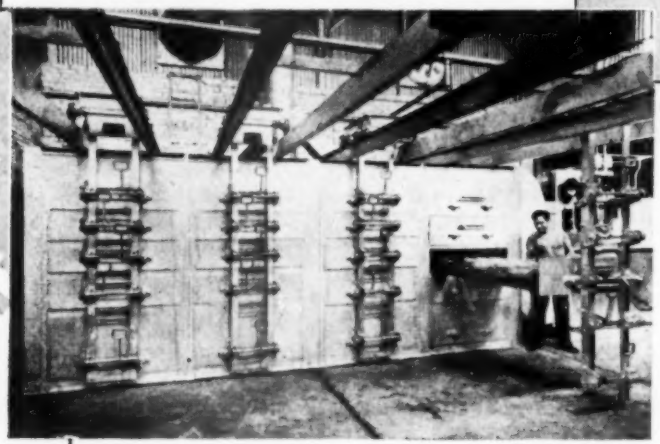
COLEMAN OVEN



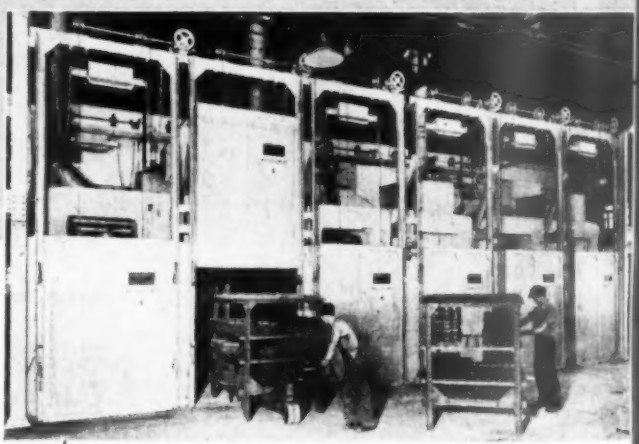
Coleman Tower Core Oven. Patented center passageway permits loading from inside as well as outside the Tower and increases loading accessibility by as much as 300% compared with other designs of vertical conveyor ovens.



Coleman Horizontal Conveyor Core Ovens for large scale specialized production.



Coleman Rolling Drawer Core Ovens for speedy baking of small and medium cores.



Coleman Transrack Core Ovens for operation with portable racks. Single or multiple rack capacity.

COLEMAN CORE AND MOLD OVENS

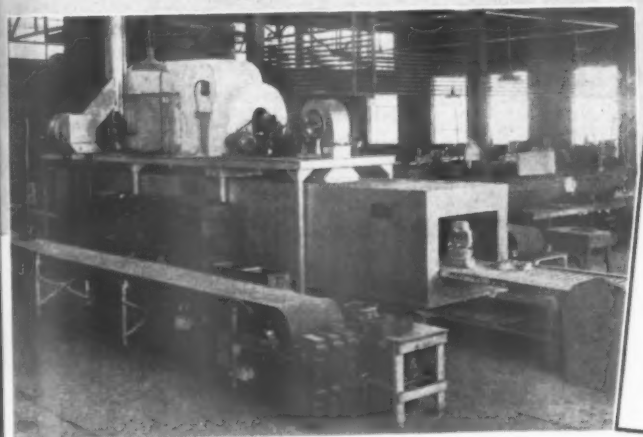
THE FOUNDRY

BUILDERS OF COLEMAN

CLEVELAND

the Most Complete Line of Foundry Ovens Built

Coleman Car Type Ovens for baking big cores and drying molds. No job too large.



Coleman Horizontal Conveyor Oven for redrying cores after pasting, blackening, or washing.

THERE is a right type and size of Coleman Oven to meet every core-baking and mold-drying need.

Coleman Ovens offer you the benefit of nearly 40 years of specialization in core-baking and mold-drying problems in every type of foundry production.

This broad experience assures right results the first time—no second guessing!

Coleman know-how means faster and better core-baking and mold-drying with less fuel and less labor.

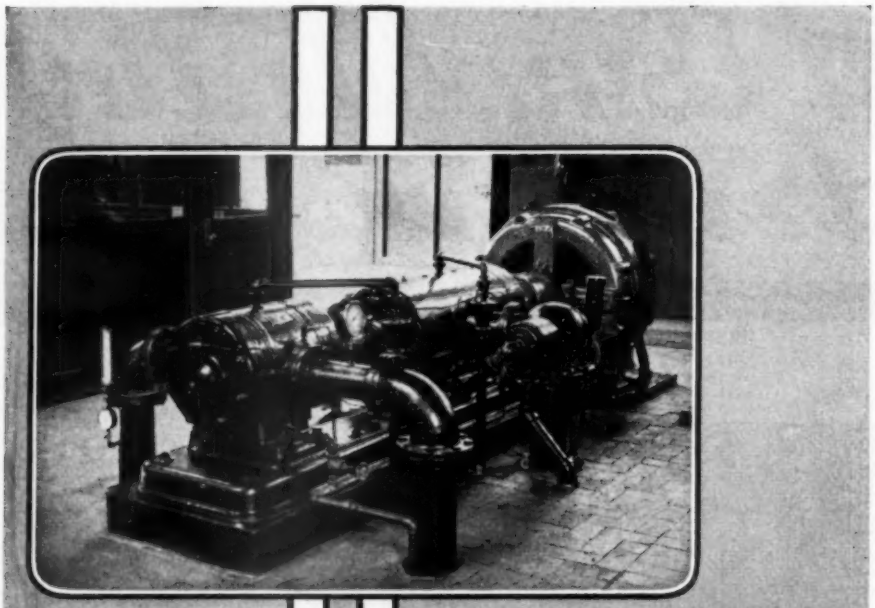
Coleman Ovens are built for operation with whichever fuel is most economically available in your district.

A complete guaranteed service with undivided responsibility from design to operation.

Write for Folio of Bulletins

DR[illegible]QUIPMENT CO.
OLEM[illegible]D SWARTWOUT OVENS
[illegible]LAN[illegible], OHIO, U.S.A.

COLEMAN
CORE AND MOLD
OVENS



ROTARY COMPRESSORS

Fuller Rotaries are doing their part for victory in many war industry plants. Shown above is one of fourteen Fullers doing duty for an eastern steel company, running night and day with minimum time out for repairs.

They'll still be running long after victory has been attained and, at maintained original capacities . . . because they're built for just that kind of service. Simple design, rugged construction . . . only three moving parts: rotor—bearings—blades.

Bulletin C-5 illustrates and describes these machines. It's yours for the asking.

fuller COMPANY

CATASAUQUA, PENNSYLVANIA

CHICAGO — MARQUETTE BLDG.

SAN FRANCISCO — CHANCERY BLDG.

C-85

FULLER

PIONEERS OF HIGH-EFFICIENCY ROTARY COMPRESSORS

(*Continued from page* 156)

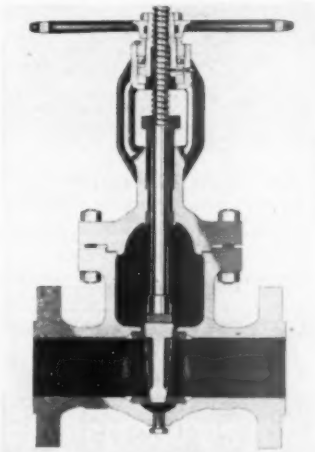
heavy duty, while 30 and 39-gage brushes are used for moderate or light cleaning. The machine also may be used for floor sanding and for steel wool buffing.

Plastic Goggles: Eastern Equipment Co. Inc., Willow Grove, Pa., announces a new safety type goggle which gives undistorted and unrestricted vision coupled with maximum protection against impact hazards. Made of one-

piece clear plexiglass, the lens extends in an unbroken curve from temple to temple without corners or sharp bends. No rivets, bars or seams are employed. One-piece arched design gives added strength. Wide distribution of contact area with face provides full protection to the eyes.

Printer: Charles Bruning Co. Inc., Chicago, announces a new machine or continuous printer which duplicates anything drawn, typed, printed or illustrated. Original material with copy on both sides can be reproduced on either or both sides. Prints are delivered ready for use. Compactly designed, the printer fits in desk top space. It exposes roll stock or cut sheets up to 24 inches wide at a speed of 5 to 30 inches per minute.

Gate Valves: Edward Valve & Mfg. Co. Inc., East Chicago, Ind., is introducing a new line of cast steel gate

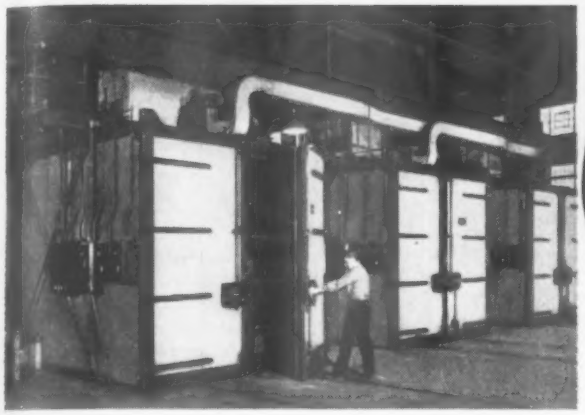


valves with basic improvements in design. Close fitting wedge guide ribs constructed by a new method eliminate

(*Concluded on page* 162)

From Core Baking Thru Metal Heat Treating

One Dependable Source One Responsibility for Better Performance of Your Ovens and Furnaces

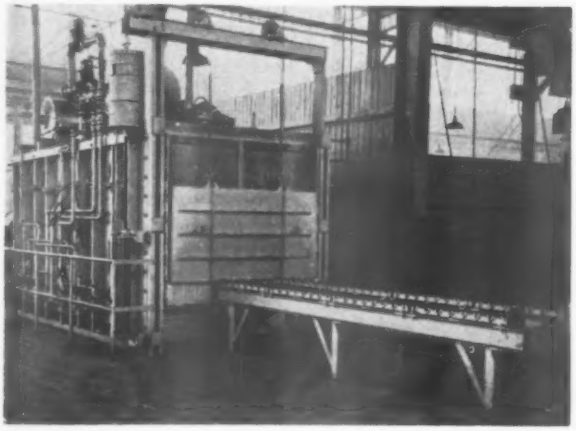


Battery of Gehnrich large, car type, gas fired recirculating convection core ovens.

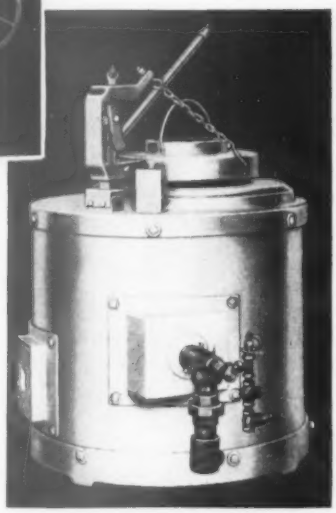
Whether you need a small batch type or a large conveyor core or mold oven, finish baking oven, crucible melting furnace or any type of annealing, heat treating, or stress relieving furnace, it's sound business to put your foundry heat processing problems up to an organization that has the engineering "know-how" to really help you.

Gehnrich Ovens and Rockwell Furnaces assure heat application and materials handling which always add up to better product at lower cost. Thousands of them in operation prove Gehnrich Ovens and Rockwell Furnaces superior in construction and performance quality.

On your next foundry heat processing job, let our engineers submit their recommendations.



Rockwell automatic, recirculating type, gas fired furnace for strain relieving castings.



Rockwell standard crucible melting furnaces, oil or gas fired. *Above*—tilting type. *At right*—stationary type.

Gehnrich continuous conveyor, recirculating convection heated, two zone control, electric oven for baking enamel on engine castings.

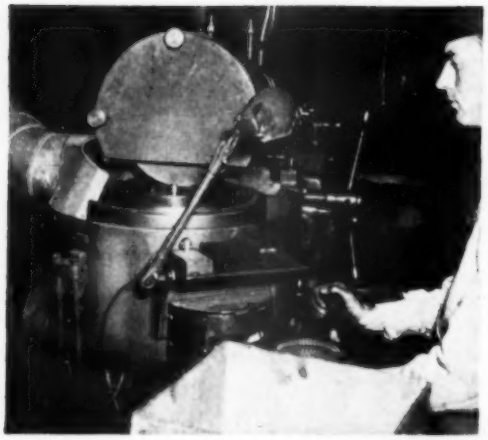
Write for Catalogs

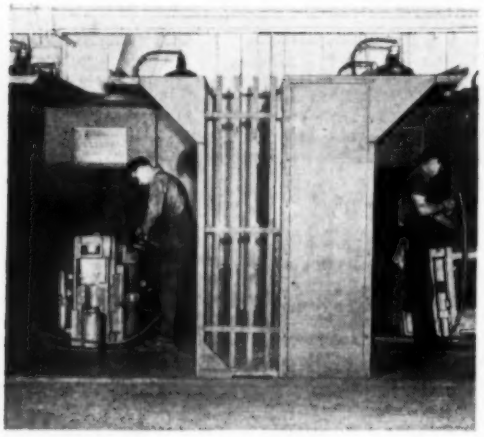
W. S. ROCKWELL COMPANY • 56 CHURCH ST., NEW YORK 7, N. Y.

GEHNRICH OVENS • ROCKWELL FURNACES

BATCH OR CONVEYOR TYPES • OIL - GAS - ELECTRIC - STEAM - COKE

Performance PROVES DUSTUBE EFFICIENCY





$12,000 Yearly Savings

Tin, lead, graphite and copper are employed in powder form for clutch plate wearing surfaces and particles of these materials arise from grinding and pressing operations at the Cleveland Graphite Bronze Company.

Through the well designed Dustube control system installed at the various processing stations, reclamation from pressing operations averages nearly 1,000 pounds of tin, lead, graphite and copper weekly (worth 20c a pound) and another 500 pounds of graphite dust (5c a pound) is picked up from the grinding mills.

Dust-Free Grinding

Each grinding booth at the Lodge & Shipley Machine Tool Company has its own Dustube and the high efficiency in which all dust is exhausted eliminates the need of respirators by the operators during routine grinding.

Complete Dustube dust control and ventilation of the booths is provided by exhausting dust-laden air at rates up to 15500 CFM through perforations in the floor and through a hood at the back of the booth.

American Foundry Equipment Co.
505 S. Byrkit Street
Mishawaka, Indiana

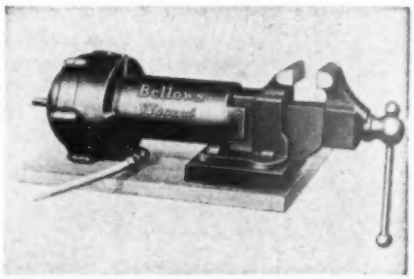
ARMY E NAVY

AMERICAN dustube dust collectors

(*Concluded from page* 160)

wear drag across seating faces. Seat rings are hard surfaced and welded integrally to the body. Specially built fixtures permit hydrostatic test of both seating faces simultaneously. All valves over 4 inches are equipped with ball bearings. In the smaller sizes a special plating process reduces operating effort on bearing plates for yoke bushings. Valve sizes range from 2½ to 12 inches and are intended to resist pressures from 300 to 1500 pounds per square inch.

Bench Vise: Bellows Co., Akron, O. has developed a new air or hand-operated bench vise consisting of a standard 4-inch vise operated by an 8-inch foot-controlled air cylinder. Clamping pressures are adjustable from zero up to 2½ tons. The unit operates through the full range of the 6-inch jaw opening. Positive safety control limits the movement of the jaws adjustable from zero to



a maximum of 1 inch. The foot control leaves both hands free. Slight toe pressure closes the jaws and heel pressure opens them. Jaws lock in either position. Normal hand operation of the vise is possible at all times. The entire assembly may be purchased as a unit, or the air unit may be purchased separately for easy attachment to any standard 4 or 4½-inch vise.

Variable Speed Drive: Lombard Governor Corp., Ashland, Mass., announces a new type variable speed unit in which the V-belt is used only as a control medium, instead of for both drive and control. Primary speed reduction is accomplished through conventional gearing. Through this new gearing arrangement 90 per cent of the power goes through conventional gears while only 10 per cent passes through the V-belt. The lower gear ratio also affords finer hairline control and insures peak production speeds. Having the variable speed output shaft concentric with the motor shaft gives it the advantage of a direct line drive. Remote control also is available with horizontally split casings optional.

Corebox Cleaner: Wolfe-Kote Co., Sheboygan, Wis., has developed a cleaning compound especially designed for keeping coreboxes, and corebox vent screens in clean, working order. The solution may be applied by brushing or spraying, or the coreboxes in certain instances may be immersed.

Globe users..

represent The Blue Book of the

FOUNDRY INDUSTRY

The Globe Iron Company takes great pride in surveying its years of close association with such an outstanding group of American Manufacturers, definitely the "Blue Book" of the foundry industry. It is a source of great satisfaction to us at "Globe", to know that we have been able to aid these Manufacturers in both war and peace production of finer, high quality metals. Globe's "Silvery," high silicon iron has been time tested in these shops and has proven its ability metals of low carbon, of uniform hardness, of strength and and with lower mixture cost. Our greatest desire is the continuing these associations and the ability to assist further in the production "GLOBE SILVERY" metals. Globe is now maintaining war production and will be ready to meet the enormous demands of our customers' needs.

BESSEMER FERRO-SILICONS
GLOBE IRON COMPANY
THE PIONEERS OF SILVERY IRON
SPECIAL HIGH SILICON GRADES

YOU CAN'T THINK OF SILVERY IRON WITHOUT THINKING OF GLOBE

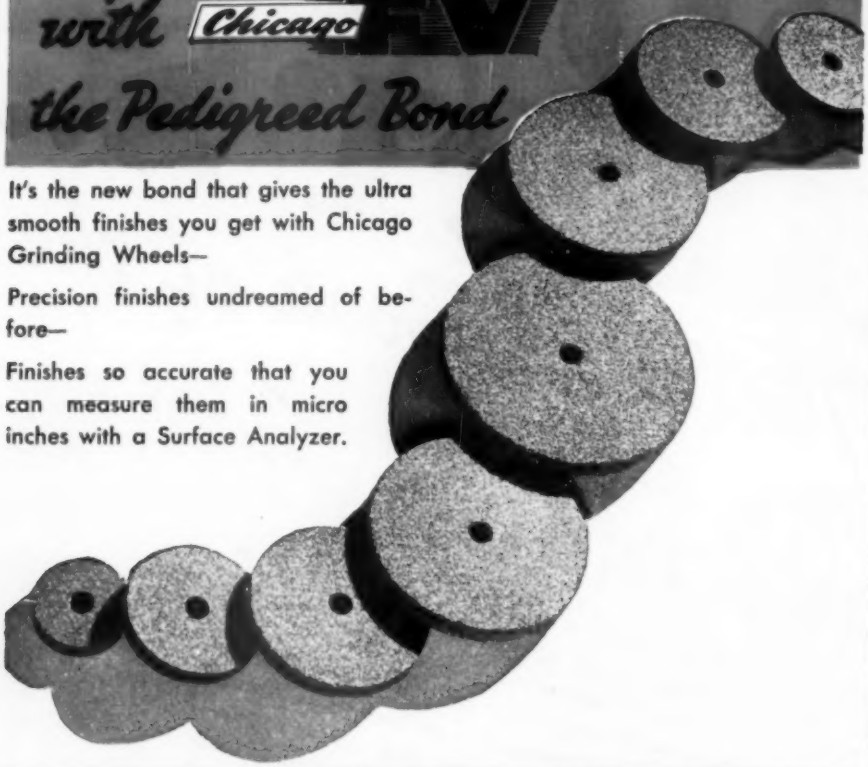
GLOBE IRON CO.

JACKSON, OHIO

BONDED

with Chicago FV

the Pedigreed Bond



It's the new bond that gives the ultra smooth finishes you get with Chicago Grinding Wheels—

Precision finishes undreamed of before—

Finishes so accurate that you can measure them in micro inches with a Surface Analyzer.

PERFECT FINISH INSURANCE

Whatever you have to finish—metals, alloys, plastics, wood, laminates or composition materials—you can do it better with Chicago Wheels.

Chicago Wheels have kept pace with the precision requirements of our war industries, and you can use them with confidence to finish civilian goods better in double quick time.

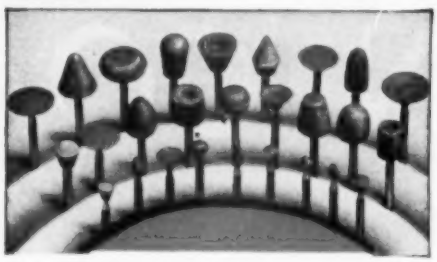
CHICAGO GRINDING WHEELS

A wide range of grains and grades and—for the duration—sizes up to 3" in diameter.

TRY ONE FREE We'll send without charge a Mounted Wheel or an FV Bond Grinding Wheel. Tell us size you'd like.

CHICAGO MOUNTED WHEELS

The first made and the finest today. In a selection of bonds, abrasives and shapes to handle each job more efficiently.



Write for Catalog listing all Chicago products and showing comparative photographs of finishes with different kinds of Wheels.

CHICAGO WHEEL & MFG. CO.

Headquarters for Mounted Wheels and Small Grinding Wheels

1101 W. Monroe St., Dept. FD, Chicago 7, Illinois

*Half a Century of Specialization has established our Reputation as the Small Wheel People of the Abrasive Industry.

Send Catalog. Interested in FD-10

☐ Mounted Wheels. ☐ Grinding Wheels.

☐ Send Test Wheel. Size .....

Name .....

Address .....

OBITUARY

WALTER M. SAUNDERS, 78, well known for his investigation of molding sand, died Sept. 22 at his home in Providence, R. I. He was one of the early investigators and consistently forwarded the work of the A.F.A. Committee on Molding Sand Research, as a

WALTER M. SAUNDERS

member of the executive committee, committees on conservation and reclamation, and on tests and subcommittee on definition of terms. Mr. Saunders was born in Johnston, R. I., and was educated in the Johnston and Providence public schools and later at Massachusetts Institute of Technology and Brown University. After 6 years as an instructor in chemistry at Brown, he became chemist in 1897 for A. Carpenter & Sons Foundry Co., Providence. In 1901 he established a commercial laboratory and in 1902 he formed the partnership of Saunders & Franklin to conduct a general testing and analytical chemical laboratory. The partnership was dissolved in 1928. During the first World War he served on the Committee of Industrial Preparedness of the Naval Consulting Board. A member of the A.F.A. since 1902 he was one of the original members of the Committee on Molding Sand Research, formed in 1921 and was chairman of the committee from 1923 to 1926. He was an active member of the A.I.M.E., A.S.T.M.; A.S.M.; New England Foundrymen's Association; Associated Brass Founders of New England, and numerous others.

° ° °

O. E. J. Abrahamson, 51, president of Headford Bros. & Hitchins Foundry Co., Waterloo, Iowa, for the past year, died recently in that city. Mr. Abrahamson was born in Eksjo, Sweden, and came to the United States in 1913. He was successively associated with Universal Portland Cement Co., Buffington, Ind., International Harvester Co., Chicago, and American Radiator Co., Buffalo and Detroit. In 1935 he was in charge of rebuilding and modernizing the gray iron foundry of Husqvarna Vapenfabriks Aktiebolag, Huskvarna, Sweden, which became one of the most modern and effi-

(*Continued on page* 166)

CLECO TOOLS

for PRESENT AND POSTWAR PRODUCTION

SAND RAMMERS
A model for every moulding job — for floor, flask, bench, and core work. Bulletin 76B.

CHIPPING HAMMERS
47 sizes and styles for chipping, caulking, beading, and scaling. Write for Bulletin 75B.

RIVETING HAMMERS
For heavy-duty work with hot rivets. Three styles of handles. Write for Bulletin 82.

ROTARY GRINDERS
35 sizes and types for all kinds of light and heavy grinding. Bulletin 80.

ROTARY DRILLS
For all kinds of drilling, reaming, tapping, nut setting, and screw driving. Bulletin 83.

SQUEEZERS
Model 41C, with "C" yoke, is a popular model among our squeeze riveters. Bulletin 85.

With fast-working, air-saving Cleco Tools on the job, you will get top production now and for years to come. Every model among the wide variety of sizes and styles is backed by our half-century of experience in this field. Write for Bulletins.

SHEET HOLDERS
Type "P", non-flying sheet holders clamp metal sheets together during riveting. Bulletin Type "P"

SMALL RIVETERS
For aircraft work. "Slow" and "fast" hitters, with many styles of handles. Bulletin 85.

THE CLEVELAND PNEUMATIC TOOL CO.

"PIONEERS FOR 50 YEARS"

CLEVELAND 5, OHIO • Branch Offices in All Principal Cities

Tomorrow

WE HAVE A JOB TO DO
in Rebuilding a War Torn World

★ ★ ★ ★ ★

HAUSFELD
METAL MELTING FURNACES

WILL DO THEIR SHARE
IN THIS GREAT WORK

FURNACES FOR BRASS, ALUMINUM, MAGNESIUM AND
ALL OTHER NON-FERROUS ALLOYS

The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

(*Continued from page* 164)

cient foundries in northern Europe. He returned to the United States in 1942 and in 1943 became president of Headford Bros. & Hitchins Foundry Co.

• • •

William E. Taylor, 61, president, Taylor & Co. Inc., Brooklyn, N. Y., gray iron foundry established in 1892, died Oct. 6, at his home at Hewlett, Bay Park, Long Island, after a long illness. He was also president of the Gray Iron Founders Association of Greater New York. Mr. Taylor was the son of the founder, William Zachary Taylor, and is survived by a son, William Zachary Taylor, who is secretary of the company.

• • •

Earl A. Burr, 66, vice president of Cleveland Quarries Co., Cleveland, died Sept. 15. Mr. Burr was born in Grand Rapids, Mich., and was educated in Cleveland, attending Western University after completion of high school. He entered Cleveland Stone Co., which later became Cleveland Quarries Co., as an auditor, and in 1928 was elected secretary. Ten years later he was elected vice president.

• • •

Robert G. Guthrie, 48, consulting metallurgist, and chief metallurgist, Peoples Gas, Light & Coke Co., Chicago, died Sept. 20 in Muskegon, Mich., where he had gone in connection with his capacity as consultant for Campbell, Wyant & Cannon Foundry Co. A past president of the American Society for Metals, Mr. Guthrie had been associated with the Peoples Gas company 23 years. He was one of the pioneers in high-power photomicrography.

• • •

Donald M. Clark, 47, president and general manager of H. W. Clark Foundry Co., Mattoon, Ill., died Aug. 30 in that city. Following his graduation from high school he became associated with the Clark Foundry Co., and in 1934 upon his father's death he became president and general manager.

• • •

Earl L. Myers, 52, general superintendent, Gisholt Machine Co., Madison, Wis., died Sept. 20 in that city. Mr. Myers entered the engineering department of the company in 1928 and was successively assistant to the works manager, main works superintendent, and was appointed general superintendent in 1942.

• • •

William M. Bager, 65, vice president of Bucyrus-Erie Co., Milwaukee, until his retirement last fall, died Sept. 27, in Pass Christian, Miss. A native of Sweden, he was graduated from the Royal Institute of Technology, Stockholm, and came to the United States in 1900, when he entered the employ of Bucyrus-Erie as a drill press operator.

• • •

Martin Pusch, 81, associated with Allis-Chalmers Mfg. Co., West Allis, Wis., for 52 years, died Oct. 4 in that city. A native of Milwaukee, he was a foreman in the foundry division at the

(*Concluded on page* 170)

Because They're Small They Have To Be Good

The smaller the grinding wheel, the more critical its quality. Each grain has all the greater responsibility. But small grinding wheels are more difficult to *make* than larger ones—it requires extra care to control consistency of the abrasives throughout each mounted wheel or point and from one to another. Bay State overcomes the difficulty by special manufacturing procedures which result in a better product, easier to use and with longer life.

Each Blue Flash mounted wheel or point is *turned down* from a large blank, and is sized and shaped *on* its own mandrel. Thus, they

need no breaking-in period, because they are dressed as they are shaped.

run absolutely true, because each is concentric to its mandrel.

have no hard and soft spots, because the consistency of grain and bond is uniform throughout.

can be used right down to the mandrel, because the manufacturing process automatically provides a positive test for adhesion of abrasive to mandrel.

These advantages of Blue Flash Mounted Wheels and Points are typical of what you can expect from the entire Blue Flash line. Into each type of product, Bay State builds *extras* that can be easily appreciated when on the job. Write for literature on the products you use—including the handy, pocket-sized catalog on mounted wheels and points.

BAY STATE ABRASIVE PRODUCTS CO.
WESTBORO, MASS.

BLUE FLASH GRINDING WHEELS *FAST and COOL*

GRINDING WHEELS · HONING AND SUPERFINISHING STONES · PORTABLE SNAGGING WHEELS
MOUNTED WHEELS AND POINTS · CUT-OFF WHEELS · INSERTED-NUT DISCS · AND CYLINDERS

Adams Slip Flasks

(Cherry or Aluminum)

–for dependable, low-cost production

Adams Aluminum Slip Flask

Adams Cherry Slip Flasks and Adams Aluminum Slip Flasks are custom-built to your specifications, with any desired length, width or depth.

Trimmings are accurately machined and can be adjusted to compensate for wear. The sand strip mechanism is quick-acting and convenient and it will stand up under the jolting and squeezing of power machines.

Pins to suit your preference — wide-V, double-V, round, double-round or special types, accurately machined on bearing surfaces.

THE ADAMS COMP

MOLDING MACHINES · FLAS

Adams Jackets

(Cast Iron or Aluminum)

—assure perfect mold protection

The unique patented construction of the Adams Cast Iron or Aluminum Jacket, combining horizontal and vertical corrugations, provides great strength and rigidity with minimum weight.

Inner surfaces are accurately surface ground, and assembly is made on a fixture to exact size and to assure correct taper in the case of tapered jackets.

Specify Adams Jackets for proper mold protection. For best results, use them in combination with Adams Slip Flasks (cherry or aluminum) or Adams Cherry Snap Flasks.

Adams Steel Jacket

Y · DUBUQUE, IOWA · U.S.A.

QUIPMENT · Established 1883

★ ★ ★ SINCE 1911 ★ ★ ★

DEPENDABLE **CORE BLOWING** EQUIPMENT

NEW HEAVY-DUTY BLOWER

FOR MOTOR CASTINGS WORK...

Strictly for BIG Cores and Fast Production
Takes Core Box up to 18" x 24"

Designed as a special blower for a leading producer of airplane motor castings, this unit is now offered as a standard Demmler blower. Features include an accurate hydraulic core box draw, table equipped with Timken rollers, 12" diameter throat opening, control mechanism totally enclosed. The height of the frame may be adapted to varying sizes of core boxes.

Reports on this new machine from users indicate that it has unusual possibilities in production of aircraft, tank and truck motor castings. At the present time we can make good deliveries, and invite your inquiries.

WM. DEMMLER & BROS. · KEWANEE, ILLINOIS

CORE BLOWERS *Exclusively*

(*Concluded from page* 166)

time of his retirement three years ago.

• • •

J. Ramsey Speer, 74, formerly president, Mackintosh-Hemphill Co., Pittsburgh, died Oct. 1, in Easton, Md., where he recently had been in retirement. Beginning his career with Schoenberger Steel Co., Pittsburgh, in 1893, Mr. Speer remained with that company for 18 months as its vice president and general manager when it was purchased by American Steel & Wire Co. in 1899. In 1899 he and his brother purchased the S. Jarvis Adams Co. and served as its vice president until 1911 when the name was changed to Pittsburgh Iron & Steel Foundries Co., and he became president. In 1922 this company merged with Mackintosh-Hemphill Co. and the A. Garrison Foundry Co., with Mr. Speer remaining as president.

• • •

Lee Kahn, 62, widely known in the nonferrous metal business in Chicago for the past 40 years, died Oct. 30. At the time of his death Mr. Kahn was an executive of R. Lavin & Sons Inc. He was formerly vice president of L. A. Cohn & Bro. and was also affiliated with S. Birkenstein & Sons.

• • •

Alexander Robertson, 67, who retired in 1936 after 16 years as works manager of the Alliance, O., plant, American Steel Foundries, Youngstown, O., died recently in Youngstown.

• • •

William H. Shepard, 86, formerly president of T. H. Brooks & Co., Cleveland, and chairman of the board of Crucible Steel Castings Co., Cleveland, as well as one of its founders, died Oct. 7, at Chardon, O.

• • •

Clifford C. Rensing, 42, sales engineer since 1929 with Aluminum Industries, Inc., Cincinnati, died there Sept. 16.

• • •

Peter Grabler, 82, founder of Grabler Mfg. Co., and Dickey-Grabler Co., Cleveland, died there Sept. 22.

• • •

Roger F. Sherman, 41, for the past two years engineer, Hydro-Blast Corp., Chicago, died Sept. 16 in Evanston, Ill.

• • •

Fred C. Kuhnie, 56, president of the American Brass Novelty Co., Grand Haven, Mich., died Sept. 27 in that city.

A.S.M.E. Honored by Ordnance Dept.

American Society of Mechanical Engineers has received the Distinguished Service Award of the Ordnance Department in recognition of scientific and engineering achievement, particularly in connection with the war effort. The organization has maintained close contact with the Ordnance Department during the years between World War I and II through its National Defense Committee, reorganized in recent years and renamed the War Production Committee.

For MELTING... NORTON Refractory Cements

NORTON REFRACTORY CEMENTS have been developed to meet the most rigid requirements. Three different heat-resisting, chemically inert materials—fused alumina, silicon carbide, and fused magnesia—may be selected, depending upon the nature of the melt. Norton refractory bonds are added to these three materials to provide a complete range of high temperature cements which can be used as plastic mixtures or for ramming or tamping into place. For example:

ALUMINUM—RC 1188, RC 1131, RC 1132—three silicon carbide mixtures, selection depending upon the application.

BRASS—RA 1144, ATM 416—brass melters have found these fused alumina cements very successful.

COPPER—RM 1140—a fused magnesia cement excellent for Ajax Wyatt induction furnaces.

ZINC—A variety of silicon carbide mixtures are available.

NICKEL CHROME ALLOYS—RM 1169—a fused magnesia mixture recommended for high frequency induction furnaces.

COPPER ALLOYS—RA 1144 (fused alumina), RM 1140 (fused magnesia)—excellent for cupro nickel and aluminum, silicon, phosphor and other special bronzes in furnaces of the vertical ring induction type.

W-Co-Cr ALLOYS—RM 1169, RM 1152—these are magnesia cements for high frequency induction furnaces. RM 1109, RM 982—these are prefired linings of fused magnesia for direct arc type furnaces.

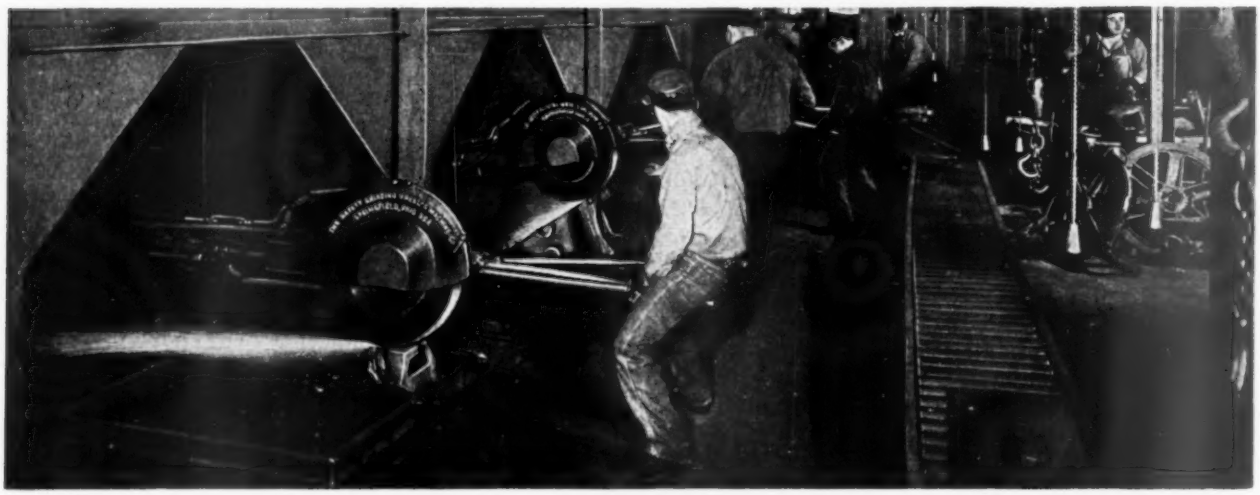
NORTON COMPANY
Worcester 6 Massachusetts

Tough GRINDING JOBS TAKEN IN STRIDE WITH *Safety* GRINDING WHEELS AND SWING FRAME GRINDERS

GRINDERS Grinding jobs don't come too big or too tough for this SAFETY Combination — SAFETY Grinding Wheels on SAFETY Swing Frame Grinder! The grinding of welds, snagging of castings, billet grinding . . . these are examples of the versatility of this SAFETY team.

Furthermore, the speed, durability, ease of operation, and high quality finish with SAFETY Wheels and Swing Frame Grinder provide labor and money-saving factors so important in these days of man-power shortage and high costs.

Wouldn't you like more of the facts and proofs of performance concerning SAFETY Swing Frame Grinders and Grinding Wheels? Just contact one of the SAFETY Offices listed below. Or write the factory direct. No obligations!



SAFETY De Luxe Swing Frame Grinder: — Used with SAFETY Grinding Wheels, assures faster, safer snagging. Speeds production! Cuts cost!

SAFETY

GRINDING WHEEL AND MACHINE COMPANY

Main Office and Factory SPRINGFIELD, OHIO, Phone 4651

● Birmingham—3-3323 ★ Chicago—TRIangle 8308 ★ Cleveland—EXpress 1445 ★ Detroit—TOwnsend 8-4740
★ Pittsburgh—ATlantic 5218 ★ Erie—23-093 ★ Philadelphia—WAlnut 3132 ★ St. Louis—CEntral 3676
★ Syracuse—3-2131 ● Milwaukee—Mitchell 0265 ★ Toledo—Main 6657

● SALES OFFICE ★ SALES OFFICE and WAREHOUSE

Meeting of Electric Steel Makers

(*Continued from page* 112)

stability and low cost but the low resistance to heat shock is a disadvantage. Use of a mortar of the same fusion point as the brick will reduce to a minimum, trouble from spalling erosion, etc. Mr. Pryor described the use of a cooling ring around the electrodes to extend roof life. The ring is constructed on a platform of its own. Employment of dense furnace charges aids roof life. Likewise use of an intermediate transformer tap until the electrodes bore into the charge extends roof life. Keeping the exterior of the furnace roof free of dust increases temperature gradient between hot and cold face, and improves life of the roof.

F. M. Gladding, Bethlehem Steel Co., stated that good results had been obtained at his plant with roofs constructed of sillimanite brick. Used on 50-ton electric furnaces, 133 heats were obtained as against 40 with silica brick. Also he said that the sillimanite roofs gave warning by sagging when near the end of their life instead of sudden failure. Mathias J. Meinen, Crucible Steel Co. of America, said that roof life increased in direct proportion to the number of times the dust was removed. A heavy slag which prevents reflection of heat to the roof aids in prolonging life, and use of larger electrode holes in the roof increases life also. He said that in one case where by accident a roof with holes for 20-inch electrodes was placed on a furnace with 18-inch electrodes, the life was increased 12 per cent, and on that basis the holes were enlarged for the 20-inch electrodes.

Should Have Larger Ring

R. H. Frank, Bonney-Floyd Co., stated that the small furnace roof should have a ring larger than the furnace to obtain better support. Bottom flange made of cast sections bolted together permitted easy replacement when warping or burning of a section occurred. Expansion strips or joints may vary from zero to 3/16-inch per foot depending upon the furnace and practice. Investigation indicated that 1½-inch space all around the electrodes gave the best results. Also in his plant melting down was accomplished with a low transformer tap until the electrodes dug down about 12 inches into the charge, and then a high tap was used. He said he believed that increase of distance between roof and bath would increase the life of the roof. He also stressed the use of heavy material at the bottom of the charge with light material at the top, and the need for keeping the roof free from dust.

A. P. Safford, Chapman Valve Mfg. Co., stated that brick should be stored carefully to prevent corner and edge breakage, and to keep them clean and dry. He said his plant practice in making roofs was to lay the bricks up dry, taking particular care with the first outside row. After all brick were in posi-

SCHRAMM COMPRESSORS ARE BALANCED

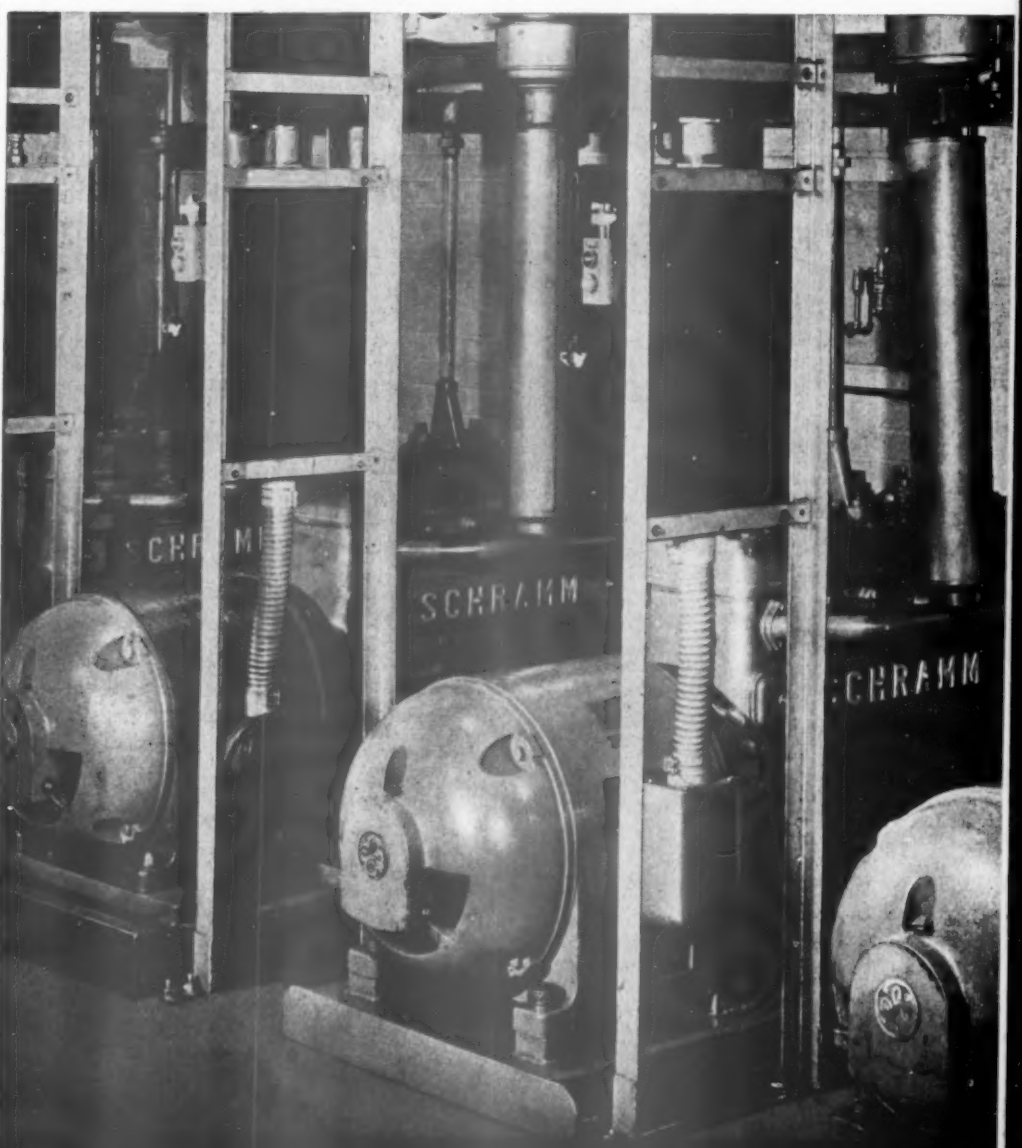
to eliminate vibration

Here's an installation showing just what can be done with an "easy-to-install," compact Schramm air compressor.

The Units represent "Utility" Compressors. Schramm compressors are available with various types belt drives, as well as built-in motor drive and direct connected diesel or gasoline engines. Other features that assure all the air you want include: 1—completely watercooled. 2—forced feed lubrication. 3—mechanical intake valve. 4—sturdy support for cylinder heads.

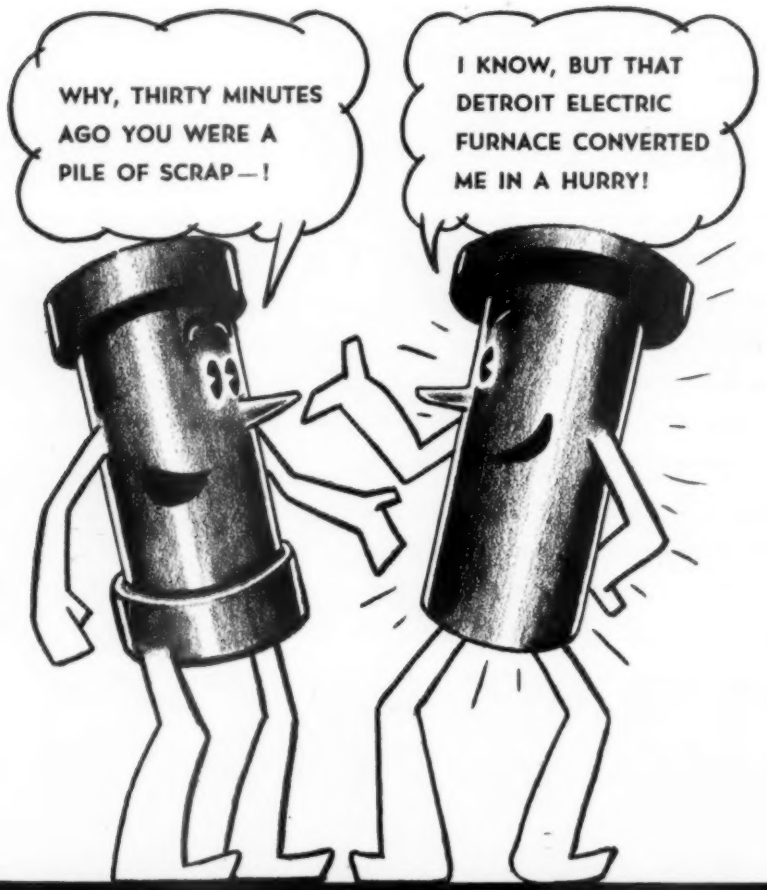
Specify Schramm Air Compressors in your plant and get heavy-duty continuous operation with least attention, upkeep and operating costs.

Write for full data in Catalog IND-44.



SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA



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tion the joints were sealed with a slurry of flour and silica. In furnace operation ore was added with the charge, and close attention was paid to slag condition; maintaining it so that hot spots did not develop to reflect heat to the roof. F. F. Dore, American Steel Foundries, in a written discussion of roofs for small basic electric furnaces pointed out that good charging is necessary to eliminate delays and cooling of the roof. He advocated water cooling of door jambs where possible and use of chrome brick if that could not be done. Roofs have longer life with high carbon steel heats than with low carbon, and lime should be added with the charge rather than after to obtain the longer life. Undercharging of the furnace will give a longer life than overcharging. At his plant no patching is performed on the roofs, and he gave cost figures as 18 cents per ton for wall, and 4 cents per ton for roof refractories.

Repair Holes in Bottom

In a discussion of basic side walls and roofs Ed Chelius, Carnegie-Illinois Steel Corp., said that excellent results had been obtained in repairing holes in the bottom and at the slag line with a cement gun and refractory mix. James A. Bowers, American Cast Iron Pipe Co., described some of the procedures in relining acid electric furnaces. The roof was removed and the lining cooled with water and fans. Then the lining was removed, and the new lining of silica brick placed in position allowing 3/4-inch between shell and brick. Time from taking furnace out of operation to charging again was from 8 to 10 hours. Repairs to wall at metal and slag line are made with a synthetic sand made up of two grades of silica sand and a molding sand. That mixture is moistened with a solution of water glass before being placed in position.

John Williams, Reading Steel Castings Division, American Chain & Cable Co. described the procedure used in his plant for making acid bottoms. Crushed ganister ¼-inch and less in size is mixed with a small amount of fireclay, moistened with 5 per cent glutrin water and rammed into place. Then the bottom is sintered into place. Repairs between heats are made with silica sand moistened with molasses water and applied with a paddle. Theodore Burke, Otis Elevator Co., described in considerable detail the procedure used at his plant for lining the walls and making bottoms in furnaces.

On Friday, Oct. 6, the technical sessions relating to acid electric furnace steel practice were divided into two phases. The first on control of bath composition was held in the morning, and the second on deoxidation was held in the afternoon. Morning session was under the direction of Chairman John Juppenlatz, Lebanon Steel Foundry, and Co-chairman John B. Caine, Sawbrook Steel Castings Co. J. S. Marsh, Bethlehem Steel Co., described a rapid method

(*Continued on page* 176)

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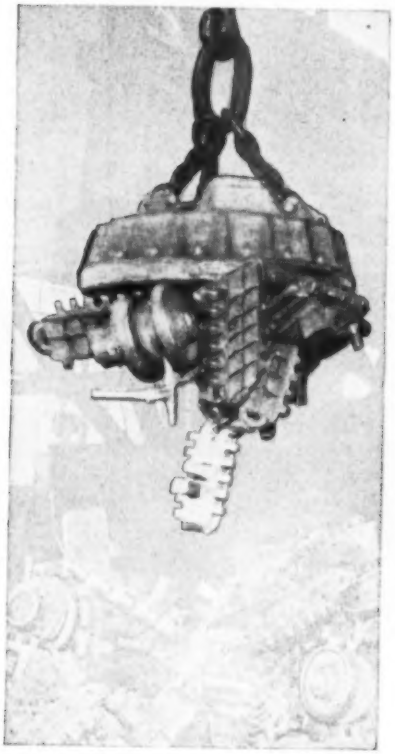

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(*Continued from page* 174)

for obtaining specimens for analysis. A metal spoon containing a roughly hemispherical depression about 1 inch in diameter was used for obtaining the sample after dispersing the slag from the top of the bath. Excess metal was poured out leaving a thin shell of metal in the spoon or thimble. That shell then was crushed in a steel mortar to form the sample for analysis. According to Mr. Marsh, the method was much quicker than drilling a test coupon.

James A. Bowers, American Cast Iron Pipe Co., stated that his firm had found that shotted samples could be obtained rapidly, and the procedure is to take a spoon of clean steel from the furnace and pour it into a deep container full of water. A 3/4-inch diameter steel rod is placed across the center of the container, and the molten steel poured so as to strike the rod which insures a good break-up of the stream. The shot sample is screened, and that which goes through a 10-mesh and is retained on a 20-mesh screen is used for analysis. By use of shot samples time for combustion carbon is reduced from 9 to 12 minutes to 4 to 5½ minutes from beginning to take sample until the report is at the furnace.

Hardness Indicates Carbon Content

E. L. Clark, Naval Research Laboratory, described a method for determining carbon content by rockwell hardness determinations on small specimen. The latter made in a split steel mold is ¼-inch in diameter and 1 inch long. Specimen is quenched in ice water, and hardness determined on the ¼-inch diameter face after cutting transversely on an abrasive cut-off wheel. The method gives reasonably accurate results for carbon control, but all operations of quenching, cutting off, etc. must be done carefully to obtain concordant data. Direct reading calibration curves are prepared from a large number of heats, and the method operates in the 0.15 to 0.50 per cent carbon range on alloy and plain carbon steels.

C. C. Spencer, Electric Steel Casting Co., discussed the determination of carbon by fracture, pointing out that appearance of the shrink indicated the silicon content, and that when silicon was high the metal when poured into the mold no sparks were given off. However, as silicon decreased more and more sparks were given off. Charles Locke, West Michigan Steel Foundry Co., presented a general description of magnetic methods for carbon determination, and that the instruments in use determined the permeability which was translated into carbon content. He said that the instruments must be simple in construction, accurate, easy to maintain, and be low in cost. E. C. Troy, Dodge Steel Co., said that with magnetic instruments careful sampling is required. The test specimen must be of standard dimensions; clean; free from slag, porosity and inclusions, and have

(*Continued on page* 178)

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(*Continued from page* 176)

a smooth surface. Since residual metals influence the permeability, and hence, the reading for carbon content, new calibration curves must be made. Usually those are needed when the residuals rise to around 0.5 per cent.

E. L. LeGrelius, American Steel Foundries, described the determination of carbon by the volumetric method using equipment produced by Laboratory Equipment Co. to illustrate the procedure. He stated that the method was rapid, and could be used by average laboratory help after short instruction. Martin Milligan, Lunkenheimer Co., described the gravimetric method for determining carbon, and pointed out that with magnetically-damped, projection type balances, weighing of the absorption tubes was accomplished easily and rapidly.

In a discussion on relation of bath condition to sampling, in which C. B. Williams, Massillon Steel Casting Co.; R. J. Wilcox, Michigan Steel Casting Co., and Dale Hall, Oklahoma Steel Castings Co., participated, it was brought out that samples should be taken for preliminary analyses throughout the heat, but when any additions were made to the bath, reactions should be allowed to go to completion before taking the sample. Clean spoons of sufficient size, say 4 inches in diameter and 2 inches deep, should be used for obtaining samples. In general the periods of taking samples for determining condition of the bath are at the end of melt down, after oxidation is completed, and after the heat is finished.

Making Carbon Additions

Methods of adjusting carbon were described and included dipping of the electrodes in the bath, addition of pig iron to the bath, and addition of graphite or other carbonaceous material to the ladle. Pig iron used is low in silicon, manganese and phosphorus, and high in carbon so that changes in other elements than carbon are slight. Referring to a silicon boil at the end of the heat which causes a reduction in carbon, it was pointed out that high temperature may cause that trouble. Another suggestion for elimination was addition of ferromanganese in the ladle instead of the bath, while a third was use of a good fluid slag rather than a heavy one.

R. A. Willey, Commercial Steel Casting Co., described a procedure for determination of residual aluminum in steel, pointing out that the interfering elements such as iron were present in large amount while the aluminum quantity was very small. Consequently, the method is divided into several steps with separations in between to eliminate undesired elements. Eventually the aluminum is precipitated as aluminum quintolate or hydroxide. The aluminum quintolate is treated with an excess of standard potassium bromide, and the excess is determined by titration with thiosulphate. Robert MacIntosh, Bat-

(*Continued on page* 180)

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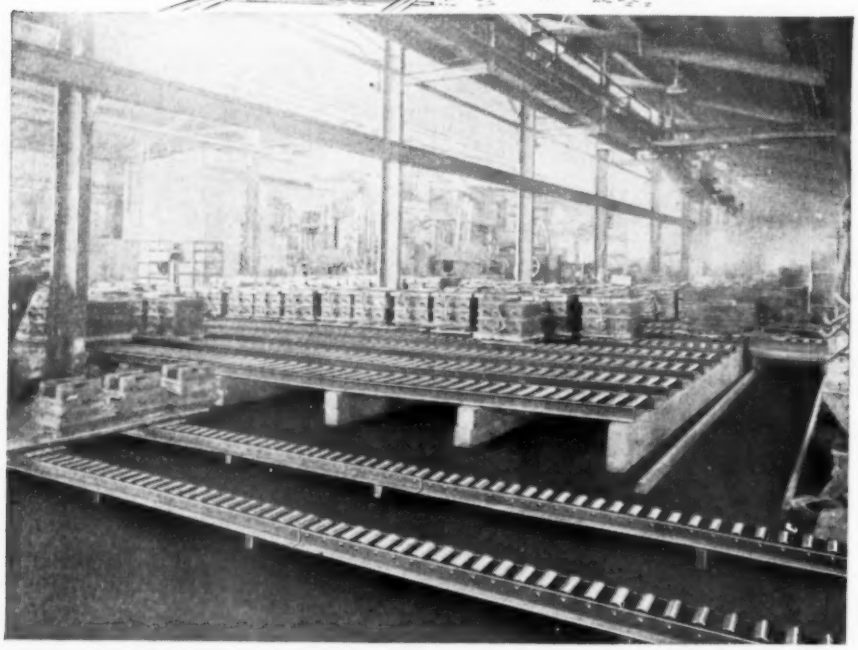

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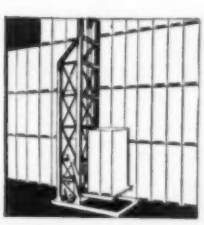
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(*Continued from Page* 178)

telle Memorial Institute, described a somewhat similar procedure but accomplished the separation of iron with sodium bicarbonate, and other elements with the mercury cathode. The aluminum is precipitated with 8-hydroxy quinoline to form aluminum quintolate.

Afternoon session on Friday, Oct. 6 was devoted to deoxidation. Chairman Fred Melmoth, Detroit Steel Casting Co., and Co-chairman G. A. Lillieqvist, American Steel Foundries, presided. Discussion was opened by C. W. Briggs, Steel Founders' Society of America, who stated that more is known of qualitative control of gases than of the desired quantitative control. Sources of hydrogen and nitrogen which form the gases in the charge may come from rusty or oily scrap, water vapor, wet slag making materials and refractories, leaky cooling pipes on the furnace, wet ferroalloy additions, holding finished heats in the furnace, and excessive arcing of electrodes. The boil will drive off the hydrogen and nitrogen, but to function adequately it must be long and vigorous. When the heat is tapped from the furnace it may pick up gases from a wet furnace spout or wet ladles, or from organic or carbonaceous matter in the spouts or ladles. Further, the mold conditions may be such that hydrogen may be driven into the castings.

Temperature Has Effect

E. C. Troy, Dodge Steel Co., pointed out that there seems to be no hard and fast rules on gassing since at times all precautions in melting and pouring steel have been breached without serious effect except where wet ladles are involved. He said he believed high temperature had a decided effect on pinhole trouble, and that the denser a mold could be made within limitations, the better the results obtained. C. E. Sims, Battelle Memorial Institute, said that there was good reason to believe that steel in the oxidized condition does not pick up gas, but after deoxidation it is particularly susceptible. Blocking of the heat after the boil may permit pick up of gases, and the gain in gas content is higher with steel in the ladle than when in the furnace. Also gas pick up from dry sand cores is greater than with green sand molds, but why that occurs is without any sound explanation.

Procedure for adding deoxidizers was discussed by several including Henry Barnett, Welland Electric Steel Foundry Ltd.; W. L. Doyle, Fort Pitt Steel Casting Co.; I. W. Sharp, American Steel Foundries; C. W. Briggs, E. C. Troy, C. H. Lorig, Battelle Memorial Institute, and Harry W. Schwartz, National Malleable & Steel Casting Co. Mr. Barnett mentioned that he had tried silex, a proprietary mixture of ferro silicon and oxidizing agents, as a substitute for ferrosilicon with good results, and that it appeared to increase fluidity of the steel in pouring. Mr. Doyle said his practice was to get the carbon in the desired

(*Continued on Page* 182)

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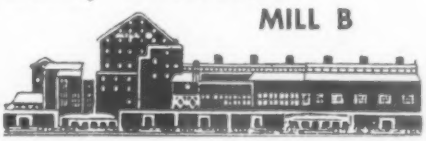
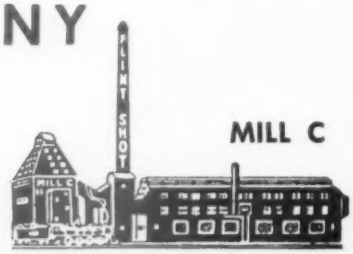


MILL C



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(*Continued from page* 180)

range, add the ferrosilicon and three minutes later take a spoon sample. Then the ferromanganese is added, and the heat tapped from the furnace, holding the slag in the furnace. Half of the aluminum is placed in the bottom of the ladle, and the remainder is added when the ladle is about three-fourths full. Calcium-silicon is added to the ladle in a paper bag when the ladle is about half full.

It was pointed out that increase in fluidity of steel would occur with the addition of any deoxidizing agent. With so-called over-reduced steel it is believed that the lack of fluidity may be due to high surface tension and oxide forms as well as the iron oxide or oxygen content of the steel. With low iron oxide content fluidity is low, and the latter increases with increase in oxide content over a broad range, and then decreases with further increase in iron oxide.

E. C. Troy mentioned the occurrence of graphitization in some steels subjected to temperatures of 850 to 950 degrees Fahr. for 3 or 4 years. The casting was welded to tubing, and the graphitization occurred at the edge of the weld. The steel contained no carbide stabilizing agent, and it is believed that addition of chromium would aid in eliminating the trouble. Also since the graphitization occurred at the edge of the weld, indications were that the high temperature to which that portion was subjected during welding was the cause. Hence, stress-relieving of the casting and other fabrication after welding would solve the problem.

Boil Removes Gases

In a further discussion of gases it was stated that in the openhearth furnace there was a definite relation between the length of the boil as well as the intensity of the boil, and presumably that may be true in the electric furnace. Probably it may depend upon the amount of carbon in the bath which is to be boiled out since it is logical to assume that the more carbon monoxide flushed through the bath, the greater the removal of hydrogen. However, it is possible that with an extremely vigorous boil the bubbles may not be able to perform their function properly. Attention was directed to the fact that hydrogen should not be considered by itself since nitrogen usually is present, and investigation indicates that nitrogen in the amount of 0.002 per cent will cause trouble when hydrogen is present.

J. B. Caine, Sawbrook Steel Casting Co., pointed out that aluminum additions to steel are important in resulting grain size as well as in deoxidation and elimination of porosity. Silicon-killed steels usually are coarse grained while those in which aluminum is used—provided that sufficient is employed to leave a small residual amount—the grain is fine. Examination of the microstructure shows that with silicon alone the inclusions are coarse and are silicates; with

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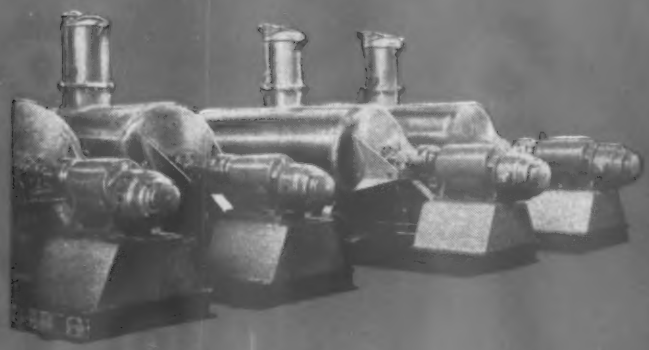

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(*Concluded from page* 182)

silicon and insufficient aluminum, the inclusions are silicates and aluminum oxide, and are coarse and fine while with sufficient aluminum the inclusions are aluminum oxide, and are fine. Mr. Cline stated that he believed a careful study of grain size of cast steels should be made for comparison with the McQuaid-Ehn test for wrought steels for example.

On the subject of lime versus no lime additions to slag, C. E. Sims pointed out that lime affects the fluidity and oxidizing power of slag since the mass action functions free iron oxide in the slag. Iron silicate slags usually are sticky at high temperature, and the addition of lime makes them fluid. John Juppenlatz, Lebanon Steel Foundry, stated that lime has little oxidizing power in itself, but its addition to slag releases an equal amount of iron oxide to react with the molten steel, and hence reduces iron ore consumption.

Determination of Sprue Size

(*Concluded from page* 88)

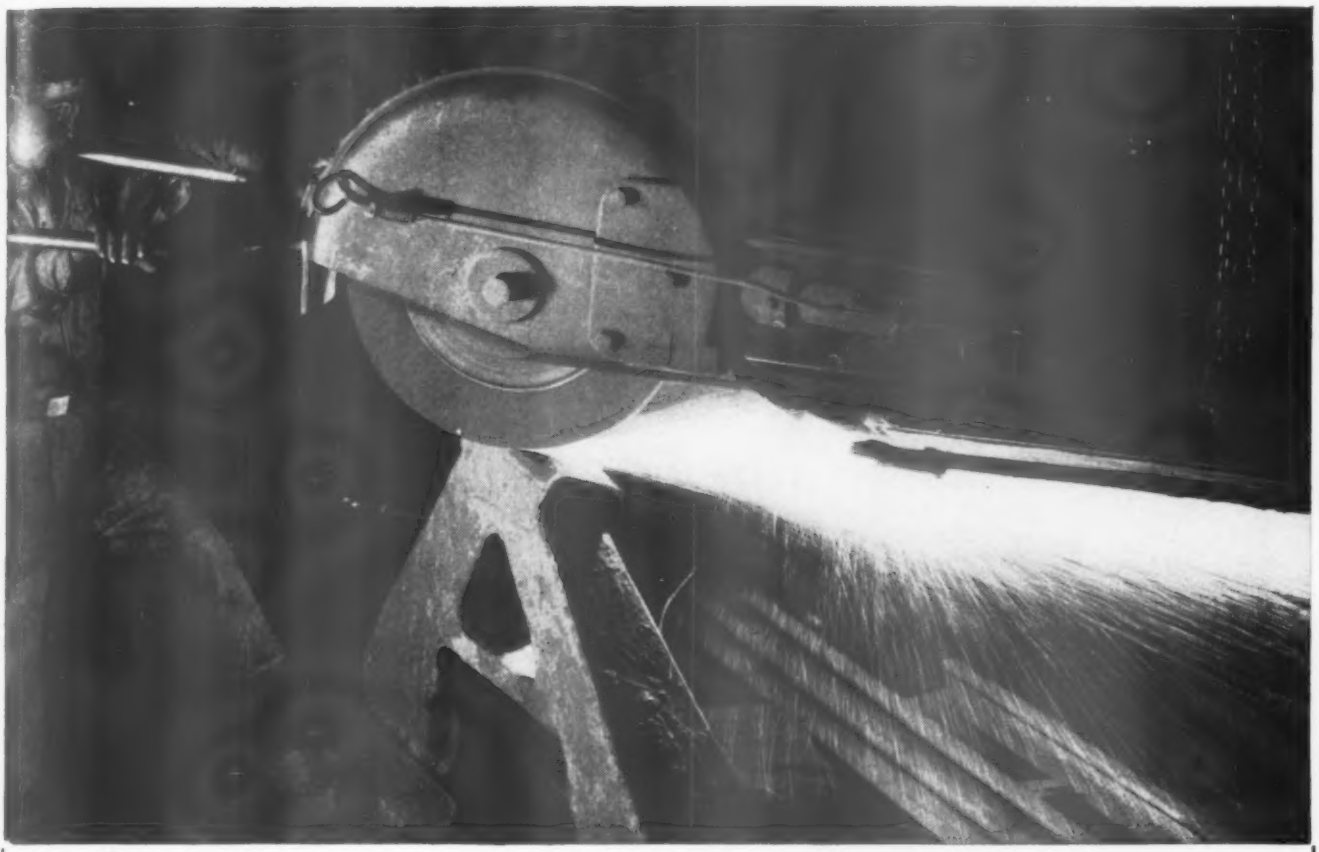
to a circular sprue with diameter of 1.7 inches, which would be the maximum size sprue that could be kept choked with the given pouring conditions. The mold would be poured in a little over 8 seconds. It could not be poured faster, but should it be desired to pour slower, say 25 seconds pouring time, procedure would be as follows: Fifty pounds divided by 25 gives a pouring rate of 2 pounds per second. Moving from the 2-pound per second point to the "10 inch height of sprue" line, and thence down, a cross-sectional area of 0.75 square inches is found, corresponding to a circular sprue of 1-inch diameter.

It should be pointed out that these calculations assume, first, that the metal retains sufficient heat to maintain the proper degree of fluidity throughout the pouring, and second, that the pouring head remains constant. In practice the fluidity can be assumed as constant if sufficient pouring temperature is used to make up heat losses in the sprue and gates.

A constant height of pouring head is, of course, never attained as the effective head diminishes as the metal rises in the mold. The actual pouring time therefore would be slightly longer than indicated by the chart. However, since it is the initial surge of metal that it is most important to choke, the maximum size of downsprue should be as shown by the calculations.

Hold Chemical Show

The third biennial National Chemical Exposition and Industrial Chemical Conference will be held Nov. 15-19 at the Coliseum in Chicago. Commercial exhibits will occupy floor space available in the Coliseum and annex. The conference, to be held on the second floor of the annex, will be devoted to applied chemistry.



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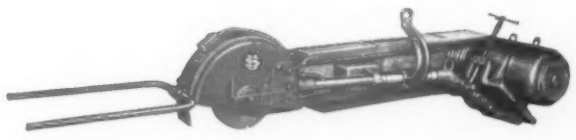
Perfect visibility; perfect balance laterally and rotatively; angular adjustment 45° to right and 80° to left; easy wheel change: ball bearing. Chips and dirt removed in grinding slide off.



Write us for delivery dates. Some models available for early deliveries

The UNITED STATES ELECTRICAL TOOL Co.
CINCINNATI, OHIO

VULCAN

DIRECT FIRED AND CONVECTION TYPE CAR HEARTH FURNACES...

Built to Handle Maximum Loads in Less Time...

View at right shows two VULCAN Car Hearth Furnaces for complete treatment of miscellaneous castings . . . one, at left, is direct fired; other is convection heated. Illustration above shows fully - loaded car leaving direct fired unit.

In this modern VULCAN installation, the direct fired furnace is used for annealing and normalizing at temperatures up to 1800°F. Convection furnace is used for stress relief, at a maximum of 1300°F. Each furnace is equipped with complete program control, including rates of heat rise and cooling; motorized car and door; and transfer car control. Five cars and one transfer car were furnished, all interchangeable with both furnaces, providing an exceptionally flexible heat treating unit.

Continuous operations at maximum capacity; a shorter over-all treatment cycle; uniform temperature at all points on the work; and important savings in operating and maintenance costs are among the advantages resulting from installation of furnaces designed and built by VULCAN. Inquiries concerning your requirements will be given prompt attention.

The outstanding success of VULCAN furnaces in many important war production plants, is proof of the soundness of their design and construction. All types can be equipped for oil, gas or electric heating.

VULCAN CORPORATION
1797 CHERRY STREET, PHILADELPHIA, PA.

PATTERNS OF GYPSUM CEMENT

(*Continued from page* 91)

better. Where a large mass of cement is used, and because of expansion difficulties, it is not advisable to bring the cement fully up to the templet with the first mix. Building is continued with a second mix. If that is not sufficient a third or even a fourth mix may be used. These additional mixes should be made at normal consistency, which means they should be more fluid than the first mix.

If the additional material crumbles or tears, a greater amount should be applied and screeded as rapidly as possible. Crumbling or tearing is caused through absorption of water by the first mix which has set. However, care should be exercised not to apply so much new mix that the entire mass will become water soaked.

When the follow board, or support has been completed, it is shellacked or otherwise sealed. Parting compound is applied over the shellac. Meanwhile the templet is changed to the face contour by cutting and filing. This is where construction of the pattern proper begins.

A new mix of gypsum cement is applied over the follow board and is screeded in the same manner as previously outlined. When this is finished the pattern may be cut to any length, carved, mitered or further fabricated in any desired manner. It is then ready for final shellacking.

Knowledge Can Be Adapted

After proficiency is acquired in running a straight molding, the knowledge can be adapted to the production of square, hexagonal, rectangular, octagonal and multi-face shapes. Joints or mitering will not be necessary. The technique is the same as that used in running a straight molding. The only difference is in the use of a slab conforming to the basic shape of the pattern, only larger to provide a sliding surface for the sled. The slab is pivoted around a center stud attached to the bench, thus permitting the job to be swung into any position convenient to the workman.

Take for example a square shell pattern high in the center. The follow board is shaped by passing the templet along each side of the slab. The templet is cleaned after screeding each face. The sled must be gripped firmly and uniform pressure applied to produce an accurate pattern as indicated in Fig. 4. The follow board is shellacked and parting compound is applied to the surface. The templet is changed to the outside contour of the shell pattern and all surplus cement is removed

(*Continued on page* 188)

WHAT IS YOUR *Cleaning* PROBLEM?

This Sly Blast Room (10′ x 16′) is equipped with Monorail and car track to facilitate handling large castings.

Note the excellent lighting. The walls and doors have an *extra layer* of steel. The ceiling is of *triple construction* to assure complete and uniform ventilation. These are standard features of Sly Blast Rooms. What is *your* cleaning problem? There is a SLY ENGINEER in your vicinity, available for consultation.

THE W. W. SLY MFG. CO.
4753 Train Avenue **Cleveland 2, Ohio**

SLY INDUSTRIAL DUST CONTROL

TUMBLING MILLS ★ BLAST CLEANING EQUIPMENT

(*Continued from Page* 186)

from templet, sled and slab. A new mix of cement at below normal consistency is placed over the follow board and screeded to shape. A second mix of normal consistency is necessary to produce the hair line detail and smooth surface. After the first set the shell pattern is removed from the follow board. If no bosses or appendages are to be added, the pattern is shellacked and then is ready for use.

Circular shapes, wheels, disks, housings, etc., are made with a modified arrangement of the run work sled. The templet is rotated around a center post to produce a symmetrical pattern. For circular shapes the templet has the center line scribed. A pivot plate is centered to this line and nailed or screwed in place on the templet board. A center post is placed in a hole in the bench. The post should have a running thread with a double nut for height adjustment. The pivot point at the top must be absolutely rigid and should be set higher than the top of the proposed pattern. The templet then will clear the pattern as it is rotated. With this arrangement, segments or complete circular forms may be produced.

Mixing and handling the cement follows the same procedure as previously described. For thin sections, a follow board is built up first, and then the pattern is built upon this foundation. Accuracy of the finished work depends on accuracy of the equipment. Under proper conditions accuracy can be maintained within 0.005-inch. Typical example of a circular shape, in this case a die in four parts, is shown in the insert in Fig. 2.

After the threads on the center post are covered to prevent adherence of the gypsum, the mix at below normal consistency is placed on the slab to approximately the height and contour of the templet. The templet then is rotated several times to screed and shape the mass roughly and to fill the voids as much as possible. The sled must be held firmly and rotated with even pressure. Set material is scraped from the templet with a saw tooth scraper. A spatula of the correct size is employed to apply a new mix at normal consistency to fill the voids. Pattern details are built up by manipulating the sled with one hand and the spatula with the other hand. When the excess cement in front of the templet loses its plasticity through water absorption, it is discarded. If necessary, fresh cement is added until all details are completed.

Finishing Not Required

When the shape is completed, excess material is removed from the finished pattern by rotating and lifting the sled simultaneously. No hand finishing is required. Step No. 1 is completed by shellacking and applying the parting compound. The templet then is changed. The second part of this pattern is a thin disk, as may be noted by the thin gap between the top of step No. 1 and the templet. The cement mix at below normal consistency is placed and screeded. A small amount of second mix at normal consistency is used to produce the fine finish. Excess material is removed as the sled is lifted while rotating. The surface then is shellacked and brushed with parting compound.

For step No. 3, the spacer ring, the templet is changed and a new mix at normal consistency is prepared. The craftsman takes full advantage of the controlled flow to place the cement in proper position for screeding. After the spacer ring is completed, it is shellacked and brushed with the separator compound. The final step is to change the templet and make the last turning with a mix at normal consistency. When this has set the sections are carefully pried apart. This is done with a thin spatula or wedge or with compressed air. Holes in the center are filled with cement. Ears are made by adding a fresh mix in the desired thickness. They are shaped by hand to conform to the drawing.

Box or rod turning cylindrical or kindred shapes requires more experience in the handling of gypsum cement than the other methods, but it is the best way. By this method the cement is formed on to a rod rotated horizontally

(*Continued on Page* 190)

Tannewitz VARIABLE SPEED BAND SAWS Are Metal-Cutting EXPEDITERS!

Removing gates and risers from steel, cast iron, manganese, bronze, hard and soft brass, aluminum and magnesium castings, as well as many other metal cutting jobs handled with great dispatch and surprising savings on TANNEWITZ VARIABLE SPEED BAND SAWS. And since they are available in any 3:1 speed ratio from 100:300 to 1000:3000 blade feet per minute, with instant adjustment to intermediate speeds, one machine serves ideally for cutting a variety of materials. Made with 30", 36" and 42" wheels.

Other models:—a similar machine to the above with 3-step V-belt drive to give 2300, 3100, 4000 blade feet per minute—a 36" machine with 32" capacity under the guide—a model with 48" wheels and one with 52" wheels, operating at 3,000 blade feet per minute for handling extra large castings. Get a line on the TANNEWITZ metal cutting band saw that fits your particular needs. It will save time, step up production and repay its cost dozens of times. Write for full particulars NOW!

THE TANNEWITZ WORKS, GRAND RAPIDS, MICHIGAN

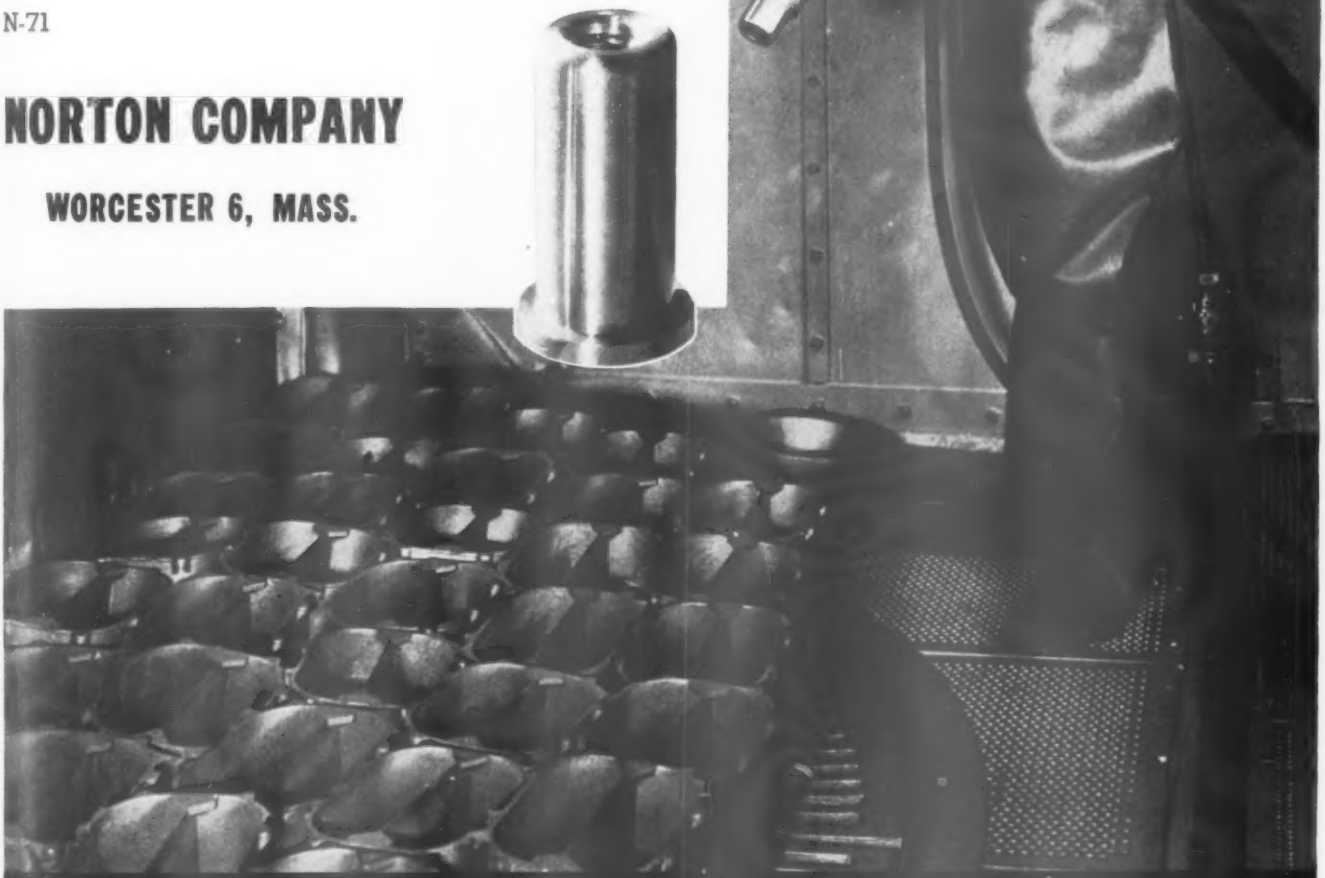
NORBIDE* NOZZLES Last Longer

NORBIDE Nozzles for pressure blasting last longer—100 times and more—because they are made of Norton Boron Carbide, the hardest material made by man. For this reason NORBIDE nozzles are extremely wear-resistant and, therefore, the opening in the nozzle remains practically constant in size for a long time. This means that the stream contour remains concentrated, abrasive velocity does not drop and air consumption is much less than with conventional types of nozzles. Frequent stops to change nozzles are banished when you use NORBIDE nozzles with their guaranteed life of 750 hours when used with sand, 1500 hours with steel shot or grit (they often give over 2200 hours with steel grit).

N-71

NORTON COMPANY

WORCESTER 6, MASS.



*Hardest Material Made by Man

(*Continued from page* 188)
in journals attached to the ends of a box. During the rotation period the excess cement is screeded by a stationary templet attached to the box face. In this method the templet is stationary and the work revolves. A small crank handle is attached to one end of the rod. The true center on the templet is cut away to allow for the diameter of the rod. An arbitrary line is established on the templet to locate it upon the templet board in the proper position. The templet board is fastened to the furring strips on the inside of the box which support the templet board at the center line height. Twine is tied to the rod at one end and then the rod is rotated until the twine is arranged in the form of a screw thread from one end to the other end. This twine forms a bond between rod and cement. The cement mix at below normal consistency is spread along the rod, thus forming a body to which subsequent mixes readily may be applied. None of the first mix touches the templet.

A second mix at normal consistency is applied and built up to the templet. The work is rotated slowly toward the operator. Another mix at normal consistency is applied to fill the voids and give final finish to the pattern, as shown in Fig. 5. When the cement loses plasticity it must be removed from the templet and discarded. The finished pattern is lifted out of the box by grasping the rod at both ends. The rod then is removed by twisting and pulling.

If considered necessary, a short piece of metal can be attached to the rod to support an extra large amount of cement. If the rod is not to be removed, the piece of metal can be welded or otherwise attached permanently. A small batch of cement is mixed at below normal consistency and spread along the entire length of the pattern. The rod is rotated slowly and as the cement creams, more is added. Too much should not be added at one time, because its own weight will cause it to sag away from the rod. With the bond broken, the pattern cannot be rotated. Only enough of the first mix should be applied to secure a firm foundation for the subsequent additions. Where gypsum cement is allowed to set undisturbed it will form a glazed surface. This surface must be roughened with any convenient tool, otherwise the following applications will not bond and are liable to peel off. The templet must be cleaned constantly to produce satisfactory work.

All additional mixes should be of normal consistency. Number of mixes needed depends on the difficulties encountered in building up the various contours. Large masses of cement should not come into contact with the templet. A small clearance space must be provided to allow for the setting expansion of the large mass. Failure to allow for this setting expansion will result in chattering as the pattern is rotated. The small clearance is filled in with a finishing coat of a fresh mix spread over the entire pattern.

Make Templet Changes

The foregoing process is changed to some extent in the production of a corebox. Templet changes must be made as the work progresses. The templet first is cut and filed to conform to the shape of the core and its prints. The core then is turned as in the preceding instance and the surface is shellacked. A dam is built up around the core at the parting line. This dam may be synthetic or natural clay, or boards sawed to the contour of the core. Parting compound is applied to the exposed surface of core and dam. Cement at normal consistency is applied over the entire area of core and dam and built up roughly to a little more than the required thickness. After the cement has set, the corebox is removed. The parting line is trued up. If the corebox is to be reproduced in metal, it can be carved to the required metal thickness and then shellacked. With the corebox finished, the templet is cut to the contour of the pattern. The surface of the core is roughened to provide a bond for the new mix. This new mix is applied to the core and screeded to the shape of the changed templet. The resulting pattern is removed and shellacked.

(*Continued on page* 192)

DAYTON
SNAGGING WHEELS

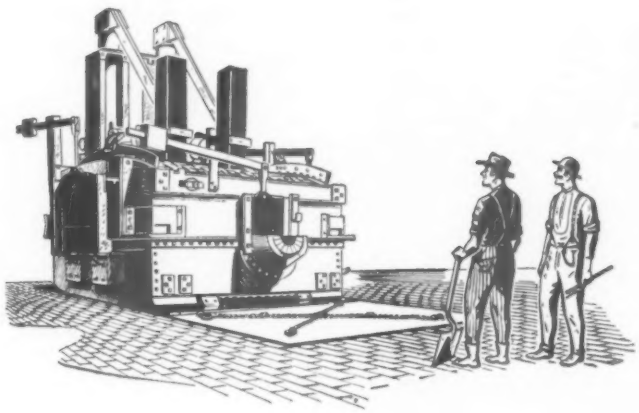
For fast snagging with minimum wheel wear or operator fatigue specify Daytons. Preferred by hundreds of steel and gray iron foundries from coast to coast for years.

SIZE, SHAPE, GRAIN AND GRADE REQUIRED. WRITE, PHONE OR WIRE.

SIMONDS WORDEN WHITE CO.

710 NEGLEY PLACE, DAYTON 7, OHIO

Number 5 of a Series: *"Looking at the 5 essential things you never see in electrodes"*



"She's as big as they'll ever be!"

AMERICA's first electric steel furnace—of four tons capacity*—did look like the limit in size. It used "National Carbon" electrodes. Electrodes for larger furnaces were "impossible."

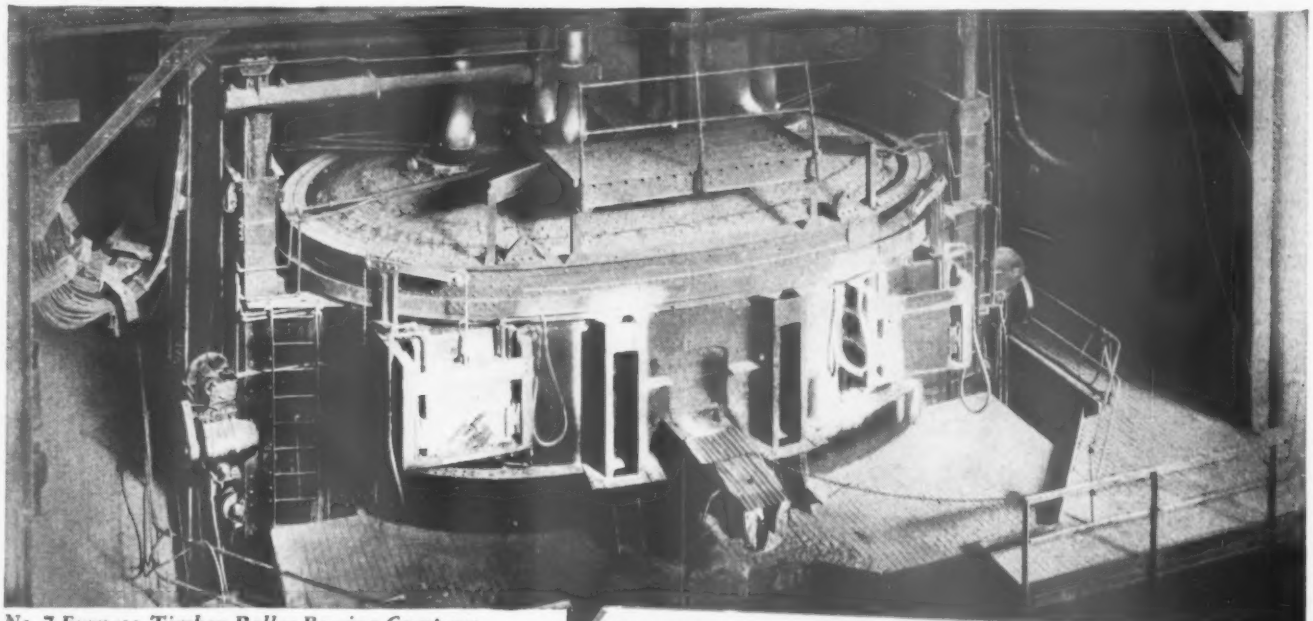
Today's most spectacular descendant of this early wonder yields an even 100 tons of electric steel from each charge. "National Carbon" electrodes serve it!

Spurring this evolution was something we call *customer service* . . . a policy of knowing and meeting our customers' needs. It covers many things, from prompt filling of orders to service within your plant. It keeps a steady eye on your industry's progress, in a constant effort to provide electrodes that meet every new performance demand.

It has helped to give you "National" and "Acheson" electrodes at lower cost per ton of steel. It has helped increase electrode strength and current capacity . . . pacing the ever-larger furnaces.

But customer service is just one of the *"five* essential things you *never see* in electrodes." They're all well worth remembering: Customer service, raw materials selection, manufacturing experience, manufacturing control, and continuing research. We welcome your inquiries.

**Installed at Halcomb Works, Crucible Steel Company of America, in 1906.*



No. 7 Furnace, Timken Roller Bearing Company, Steel and Tube Division, Canton, Ohio.

NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
UCC
GENERAL OFFICES: 30 East 42nd Street, New York 17, N.Y.
DIVISION SALES OFFICES: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco
In Canada: Canadian National Carbon Company Limited, Welland, Ontario

NATIONAL CARBON — ACHESON GRAPHITE

The registered trade-marks "National" and "Acheson" and the "National" and "Acheson" Seals distinguish products of National Carbon Company, Inc.

BUY UNITED STATES WAR BONDS

(*Continued from Page* 190)

Built-up work is required for designs of irregular shape, or combinations of shapes, or where patterns are to be produced with the aid of lofting templets. By combining shapes produced by any or all of the foregoing methods, types of patterns that can be made by built-up work are unlimited. To make a composite pattern, the different sections can be glued with burnt shellac. In some instances a certain amount of free-hand work will be required to make the joints.

For built-up work a fiber reinforced gypsum cement slab approximately ¼-inch thick may be used instead of metal reinforcement. The fiber is spread over the bench and the mix is spread into it. The fiber slab is sawed to size and may be bent to serve as a backing to span gaps and fit between templets. Templets also may be made of cement. The fiber slabs are bent and tacked in place with cement. Fiber bats then are dipped in the cement mix and placed over the slabs to reinforce the pattern. The bats are applied almost to the templet line. Space must be allowed between the bats and the finished templet line for a finish coat of cement. Care must be taken in handling the bats to keep them flat so that they may be spread evenly. When the body is built up within approximately ¼-inch of the finish line, cement is spread over the surface with a spatula and scraped as smooth as possible before it sets. Wavy surfaces are avoided by scraping in various directions with the saw tooth edge of the scraper. The final finish is produced by planing, carving and sandpapering. To strengthen the pattern, supporting strips of wood or metal are placed on the inside and tied in place with bats dipped in the mix.

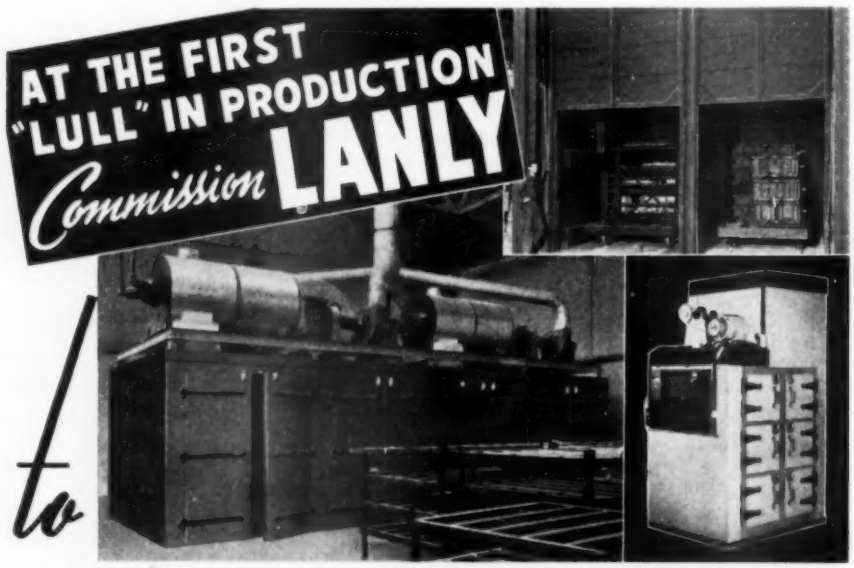
In built-up work gypsum cement slabs are employed in the same manner as boards in wood work. Slabs may be cast by spreading the cement on the surface of the work bench. As it creams, it is built up to any desired thickness. If both faces are to be parallel, the center should be built up a little higher and some thickness blocks are placed at the edges. A piece of glass then is pressed down until it rests on the blocks. The excess cement will be squeezed out at the sides. Slabs can be made to any thickness or contour. They can be reinforced with any convenient reinforcing material.

When lofting templets are used, as in aircraft or similar type work, they are set up in their specified position. The gaps or spaces between the templets can be spanned by reinforced slabs or expanded metal. The slabs may crack in bending, but the cracks will bind when a new cement mix is added. The cement is put on free-hand in the shape of the lofting templets mostly while the cement is in the plastic stage. After it has set it can be carved, scraped, or additional cement may be applied. Gypsum cement never should be carved unless it is moist. If it is dry it will chip ahead of the carving tool, thus making it impossible to make a smooth cut.

Reinforced with Hemp

The most widely used reinforcement for cement patterns is uncarded, long fiber hemp. Hemp is matted in baling and must be picked apart to loosen the individual strands. A handful is made into a flat bat and dipped into the cement mix. This bat can be incorporated in the under-coating of cement and thus becomes an integral part of the pattern. Number of bats depends on the size of the job. Handfulls of hemp can be dipped into the cement and formed into a rope to tie wood or metal reinforcements in place. Thin, flexible slabs can be made by spreading the hemp on the bench and applying a thin coat of cement over it by firm pressure. After setting it can be cut into convenient slabs. Uncarded hemp or sisal fiber can be obtained from wholesale distributors, or in small quantities from local upholsterer's supply houses. Other reinforcements are wire mesh, metal rods and flax fiber for delicate work. Wire can be used as a reinforcement, but it must be wrapped with dipped hemp or flax fiber to form a mechanical bond between the wire and the cement. Metal rods and wood bar reinforcements, handling supports for the pattern, should

(*Concluded on Page* 194)

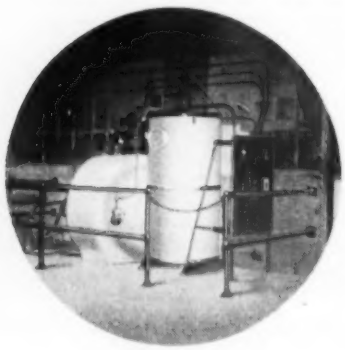


REBUILD *and* RECONVERT
WORN or OUTMODED EQUIPMENT

Order cutbacks will bring "respites" to many overworked core and mold ovens and give manufacturers opportunities to replace—repair equipment—modernize it—or modify it to meet new demands.

Time can well be spent in advance to determine who is most competent to handle such problems with which you are likely to be confronted.

The designing of all types of foundry ovens and the rebuilding and remodeling of various kinds and makes of equipment, qualifies the Lanly Company for the competent handling of this kind of work.



Lanly heaters have a wide range of capacity and are very flexible as to position of installation.

The insulated sectional panel construction of Lanly ovens makes them relatively easy to move, enlarge or rearrange to fit new requirements.

The Lanly Catalog illustrates the wide scope of experience. Send for a copy.

If you have an unusual or entirely new problem we'll be glad to discuss it with you. No obligation will be entailed.

THE LANLY CO.
OVENS FOR INDUSTRY
HEATED BY GAS, OIL, ELECTRICITY OR STEAM
750 PROSPECT AVENUE · CLEVELAND, OHIO

by assuring MORE PRESENTEE-ISM

KIRK & BLUM DUST and FUME CONTROL HAS MADE A SUBSTANTIAL CONTRIBUTION TO *Victory*

Workers who breathe clear, clean air, free of harmful dust and fumes, are far less susceptible to common or occupational diseases . . . far less apt to join the ranks of temporary or permanent "absenteeism." These "presentees" are not only more consistently *on* the job—they do a more consistently *better* job.

This is *fact*—proved throughout our period of intensified war production just as it had been previously proved in peace time. The evidence speaks for itself, in the hundreds of plants equipped with efficient dust and fume control systems designed and installed by Kirk & Blum "air engineers."

Kirk & Blum systems are backed by 37 years of specialized engineering experience.

Designed to meet individual plant requirements, they guard workers' health . . . increase man-hours and man-efficiency . . . retard deterioration of machinery and other equipment . . . step up production and lower costs.

In modernizing present equipment or planning for reconversion, you'll be wise to follow the example of leading industries everywhere—by getting the unbiased counsel of K & B "air engineers" on all problems of dust or fume control.

Send for Booklets

Dust Collecting Systems in Metal Industries
Fan Systems for Various Industries
Blower Systems for Woodworking Plants
Industrial Ovens
Cooling Systems for the Glass Industry
Data on Kirk & Blum Production Facilities

The KIRK & BLUM MANUFACTURING CO.
2808 SPRING GROVE AVE. CINCINNATI 25, OHIO

KIRK AND BLUM

(*Continued from page* 192)

be tied on to the work with hemp fiber after the setting expansion, to avoid distortion. Wood never should be imbedded in the cement as a reinforcement. The moisture in the cement will cause the wood to swell and distort the pattern.

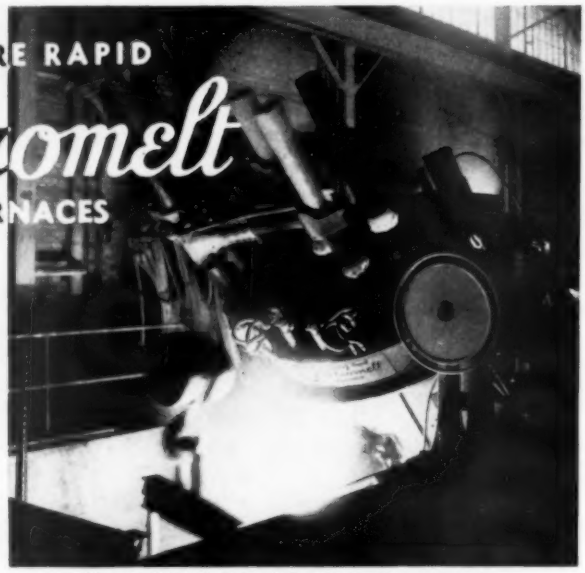
In pouring plaster into a mold the mixture is poured into the cavity from one side; in this manner the air is driven ahead of the cement and thereby reduces the number of air bubbles. One of the characteristics of gypsum cement is the tendency to form pin holes or air pockets on the surface. To eliminate and breakdown as many of these bubbles as possible, the mold should be jarred or vibrated during the pouring process. Another method often used successfully to prevent the formation of air pockets is to spread a layer of cement over the face of the mold and then tamp with a brush. When the air bubbles are broken down the remainder of the mold may be filled with cement. The bristles should be as stiff as badger hair and should be rinsed thoroughly immediately after use to prevent the cement from setting at the base of the bristles.

Armstrong Foundry & Mfg. Co., St. Louis, has been incorporated with $15,000 capital by William Armstrong.

MOORE RAPID

Lectromelt

FURNACES



Illustrated is a Lectromelt Top Charge Furnace pouring a heat in a modern foundry.

for

INCREASED FOUNDRY PRODUCTION

Almost all of the Lectromelt Furnaces installed in the past few years have been of the top charge type. The top charge feature offers many advantages such as greater output due to decreased charging time, lower power and refractory costs, increased production per man hour and many others. The following table lists some pertinent data on the Lectromelt Furnaces that are generally used in foundry work:

LECTROMELT SIZE	USUAL HOURLY PRODUCTION RATE*	USUAL SIZE OF HEAT**	NOMINAL SIZE OF SUBSTATION
OPT	4½ Tons	8-9 Tons	3000-3750 kva
PT	3 Tons	5-6 Tons	2000-2500 kva
CQT	2 Tons	3½-4 Tons	1000-2000 kva
QT	1½ Tons	2½-3 Tons	1200-1500 kva
RT	1 Ton	2 Tons	800-1000 kva
ST	1000 Pounds	1 Ton	400-500 kva
TT	500 Pounds	1000 Pounds	300-375 kva
UT	250 Pounds	500 Pounds	200-250 kva

*On acid practice or single slag basic practice.
**The furnaces are so constructed that, when the occasion demands, especially large heats can be poured, considerably in excess of the "usual" heats listed.

PITTSBURGH LECTROMELT FURNACE CORPORATION
PITTSBURGH, PENNSYLVANIA

POSTWAR OUTLOOK FOR CASTINGS

(*Continued from page* 93)

include auto and machine parts, valves and steam specialties, agricultural implements, heavy machinery, special machinery and engine manufacturing. Similarly, better than average gains for steel castings are forecast for agricultural implements and heavy and special machinery, with most other classifications showing no significant variation from the average.

Both malleable iron and brass and bronze show up relatively best in valves and steam specialties, agricultural implements, engines and special machinery. Aluminum tops the average in airplane parts, special machinery and machine tools, while the outstanding gain indicated for magnesium castings is in automobiles, trucks and tractors.

Suggest Possible Trends

Analyzing individual industries gives no positive conclusions but does suggest some possible trends. In the automotive and tractor group, castings seemingly having best prospects for sustained or increased consumption are magnesium, steel, brass and bronze and aluminum. This does not alter the fact that gray iron castings probably will continue to be the largest tonnage item of cast products consumed by the automotive industry, although 22.7 per cent of the reporting group forecasts reduced use of gray iron castings. In the farm implement industry, reduced use of both gray iron and malleable castings is expected by one-fourth of the plants, the remainder planning unchanged or increased consumption. About 17 per cent plan to cut use of steel and brass and bronze, while only 8 per cent will use less aluminum.

No significant relationship between future use of different types of castings are evident in figures for railroad equipment builders, although it will be noted that the percentages of reporting plants that indicate they will use less of each of the six types are higher than those for any of the other industries in this tabulation.

Among machine tool builders, 83.8 per cent of the plants look for increased or the same amount of gray iron use—varying but little from corresponding percentages of 86.4 per cent for steel, 83.6 per cent for brass and bronze and 87.1 for aluminum but somewhat above the 76.7 per cent for malleable.

Although the study lacks information regarding the extent of the increased or decreased use expected for various types of castings, a breakdown relating the data to size of reporting plant—as measured by employment—gives some information in this respect. For instance, a

(*Continued on page* 196)

NO CRACKS, NO BLISTERS, NO PEELING ON MOLDS SPRAYED WITH MEXACOTE

Mixed into a paste, then thinned with water to 40°-60° Baume, Mexacote sprayed on molds hits a new high in mold wash efficiency. The surface may be quickly dried, immediately after application, with a blow torch and no matter how severe the torching, it will not crack, shrink, scab, peel, or buckle. Mexacote is versatile—may be used on all kinds of green or dry sand or loam molds. Mexacote is fire proof—it contains no hazardous volatile matter. Mexacote saves time—it helps insure smooth, clean, castings and thus eliminates much of the usual cleaning. Mexacote is the all purpose blacking—equally effective on either molds or cores. When dipping cores apply at 35° Baume; when spraying, apply at 25° Baume.

In spite of its effectiveness, speed of application and improvement of casting quality, Mexacote costs less than other mold or core washes. If you are interested in improving your casting surfaces, saving time and cutting your foundry costs write us today for complete facts.

Mexacote

THE UNITED STATES GRAPHITE COMPANY • SAGINAW, MICHIGAN

(*Concluded from page* 194)

large proportion of the plants which will use fewer gray iron castings are in the employment groups having 250 or more workers. On the other hand, plants expecting to use fewer malleable iron castings are fairly well distributed among all of the various size units, one exception being the under-25 classification which indicates less than half the average loss.

The largest percentage gains in steel castings appear to be among plants employing fewer than 250 men, but the outlook also is a shade better in the larger employment groups than for gray iron or malleable castings. Prospects for aluminum castings by no means parallel those for the five other types. The largest net gain will occur in the 500-1000 employment group with 63.8 per cent of the plants indicating increased use, 31.9 per cent the same amount and 4.3 per cent less. For the over-1000 employe group, the respective percentages are 54.3, 32.6 and 13.1. Substantial increases, of course, are forecast in the other groups. The net increases in brass and bronze castings are principally in the smaller employment classifications. Principal cutbacks in magnesium castings will take place in the two top employment brackets, although somewhat similar recessions are scheduled for those with 100-250 and 25-50 workers.

By way of comparison with the casting data shown in Fig. 2, figures compiled on other forms of metal are as follows.

Stampings: Percentages of users expecting increased use—steel 59.3 per cent, brass and bronze 33.8 per cent, aluminum 48.4 per cent, magnesium 17.4 per cent; expecting decreased use—steel 6.9 per cent, brass 11.3 per cent, aluminum 10.1 per cent, magnesium 16.8 per cent.

Forgings: Percentages of users expecting increased use—steel 41 per cent, brass and bronze 20 per cent, aluminum 23.4 per cent; expecting decreased use—steel 10.3 per cent, brass and bronze 35.9 per cent, aluminum 17.8 per cent.

Plastics undoubtedly will play an increasingly important role among the materials of the future, although it is not competitive with castings in many applications. Current annual production capacity of plastics is estimated at more than 300,000 tons, compared with actual production in recent years of more than 10,000,000 tons of gray iron castings, 2,700,000 tons of steel castings, 900,000 tons of malleable iron castings, 220,000 tons of aluminum castings and 31,000 tons of magnesium castings.

Among the companies queried in this study 61 per cent expect to use more plastics in peacetime products, 31.5 per cent will use the same amount and only 7.5 per cent expect to use less—a larger proportion for increased or the same amount of use than is predicted for steel, copper and brass, aluminum or magnesium.

Another interesting point brought out in this study is the opinion of the metalworking industry on the question "Do you favor the present movement toward specification of steel and other materials on the basis of physical characteristics and ability to perform rather than on chemical analysis?" The replies show that 92.1 per cent of all plants favor specifications based on the performance of materials, and the overwhelming preference points to increasing adoption of this basis for purchase of metal products.

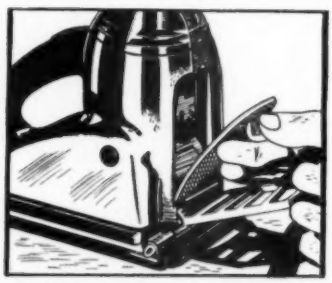
No Vibration in New "Orbital Action" Portable Electric Sander; Relieves Workers' Fatigue

A boon to workers' nerves and health, this new "Orbital Motion" electric sander is actually vibrationless. A great saver of workers' energy as well as man-production hours, the sander can be operated easily in horizontal, vertical or inverted position with one hand. Compared to manual sanding, this machine achieves superior results at least eight times faster. It performs equally well on wood, metal or plastics.

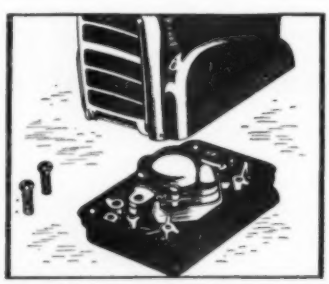
Developed for war industry, this revolutionary new sander has done yeoman duty in this country's manufacturing plants and in allied maintenance and repair depots all over the world.

Wrigley's Spearmint Gum renders a real service to workers too—eases dry throat and relieves tension that brings on fatigue, leaving both hands free to stay on the job. The Army and Navy were quick to appreciate these benefits, that's why they are now shipping to our fighting forces overseas only, our entire limited production of Wrigley's Spearmint. Just as soon as we can supply the home front, too, industry will again enjoy the benefits of Wrigley's Spearmint Gum now proving so important on the battle fronts.

You can get complete information from Sterling Tool Products Company, 155 East Ohio Street, Chicago 11, Illinois



Easily-removed filter cleans air that cools motor—prolongs motor life and reduces maintenance costs.



Dustproof transmission synchronized to eliminate vibration. Oil supply lubricates for 100 operating hours.

Y-160

Offers Handbook to Bentonite Users

A handy pocket-size handbook *Foundry Bentonite Hand Book* recently issued by F. E. Schundler Bentonite Co., Inc., Belle Fourche, S. Dak., presents a great deal of condensed information on the origin and uses of bentonite, properties of interest in foundry practice, typical and suggested combinations of sand mixtures for molding gray iron, malleable, steel, brass and bronze, aluminum and magnesium castings. Tables of weights, measures, melting points, shrinkage, metric and decimal equivalents. A number of pages at the back are provided for recording notes and observations on sand mixtures and other features of daily operation.

WHERE EXPERIENCE IS OF FIRST IMPORTANCE

There are few pieces of industrial equipment in the design and manufacture of which first hand experience and "know how" are of such vital importance as in industrial ovens. Factors which are seemingly negligible to the inexperienced often have far-reaching effects in the actual performance of an oven when finally put into service. Seldom do any two ovens, even in the same plant, operate under identical conditions. Allowance must be made for all the variables if maximum baking speed and economy are to be realized.

In addition, the oven design must take into consideration the probable future changes in the user's product and be flexible enough to accommodate such changes.

If you want maximum oven effectiveness and highest baking speed, take advantage of the broad experience of oven engineers who devote all of their effort to this branch of engineering and have proved their ability.

YOUNG BROTHERS COMPANY

6508 MACK AVENUE **DETROIT 7, MICHIGAN**

WASHINGTON
★ ★ ★ Notes

ALTHOUGH obviously heading down the home stretch, the war production program is in the difficult position of attempting to maintain full speed ahead in the face of knowledge that a drastic slowing down will be in order in various directions after that indefinite V-E Day. For instance, Army requirements for heavy artillery ammunition and heavy-heavy trucks—two of the critical items today—will be cut more than 70 per cent after Germany's collapse; communication and electronic needs will be halved.

★ ★ ★

In round figures the coming overall cut is placed at 40 per cent, or nearly $30 billion, and will affect some 4 million workers. Probably 60 per cent of the cut will take effect the first quarter after V-E Day, 20 per cent the second quarter and the balance during the following 6 months. Labor involved in war work will drop in proportion.

★ ★ ★

IT IS APPARENT that even a 40 per cent cutback in munitions production will still leave a substantial flow for the war in the Pacific, since it is predicated on the 1944 quota of more than $67 billion. Equally obvious is that the initial major retrenchment will not be uniform geographically. Some regions may lose four times as much of their war work as will others. Michigan will be hit by the slowdown in trucks and tanks, the Southeast by reduced ammunition needs. Certain cities without industrial diversification face the loss of 85 per cent or more of their recent war work.

★ ★ ★

One of the promised attractive features of V-E Day is the revoking of about 350 of WPB's 500 orders and regulations. Most of those to be retained apply to chemicals, textiles, forest products and other materials in which shortages are expected to continue until we are through with Japan. Orders controlling metal products are to be virtually eliminated.

★ ★ ★

BRASS and bronze castings may be made against unrated orders after V-E Day, provided they do not interfere with a foundry's remaining war work. Such orders may be accepted now but may not be scheduled or filled until the appointed time. Allocation of brass and bronze ingot, scrap and refined copper will be abolished after V-E Day.

★ ★ ★

Production control over cast iron kitchen utensils has been dropped by WPB. Manufacturers previously were restricted in the types of ware they could produce. No marked increase in production is expected since most companies have been running at capacity with facilities not needed for war work.

★ ★ ★

ALL government controls over the use of magnesium for civilian products have been removed with the revocation of Order M-2-6. However, restrictions in other orders as to the quantity of an article that may be made or as to its size or type remain applicable even if the article is made wholly or partly of magnesium.

★ ★ ★

Order E-11, applying to delivery of foundry equipment and electric metal melting furnaces, has been revoked by WPB. Reason given for its cancellation is that unfilled orders have dropped sufficiently that no difficulty is anticipated in

(*Continued on page 200*)

Low operating costs with a

TESSMER sprue cutter

The Tessmer principle of sprue cutting by a single sharp stroke insures low operating costs because:

1. Its tool steel cutting knives cannot fill with soft metal.
2. It needs no auxiliary exhaust system to carry off fine metal particles and dust.
3. The only ordinary maintenance cost is the occasional sharpening or rare replacement of its alloy steel cutting knives.
4. All moving parts are properly lubricated and covered to protect them from dust and dirt.
5. Its sturdy simple construction is engineered to give long trouble-free operation.

For prompt deliveries write or wire to:

Milwaukee
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Juniata

The UNIVERSAL FOUNDRY SAND

JUNIATA natural and artificially dried sands have a fusion point of 3100° F. They are more than meeting all performance requirements for cores and molds in leading nonferrous, gray iron and malleable foundries throughout the United States and Canada.

This is one of our several large deposits in year-round operation at Banksand, Juniata Township, Michigan.

A Great Lakes Metallurgist or Sand Technician will, without obligation, make recommendations as to how Juniata Sands will improve castings finish and reduce losses.

IN MOLDS:

Highly Refractory
Permits Hard Ramming
Gives Sharper Profile
Bonds Adhere Readily
Ideal Facing Sand Base
Rapid Mixing or Mulling
Uniform Grain Distribution

IN CORES:

Free Flowing
Saves Binders
Resists Sagging
Smoother Surface
Highly Permeable
No Metal Penetration
No Clay or Lime Defects

Great Lakes
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MINERS • PROCESSORS • FOUNDRY, METALLURGICAL AND SAND BLAST SERVICE

FOUNDRY SANDS • SILICA SANDS
SHOT—GRIT—BLAST SANDS
REFRACTORIES • BENTONITE
RE-BONDING CLAYS

(*Continued from page* 198)

meeting future requirements. However, rated orders continue to take precedence.

★ ★ ★

MATERIAL has been authorized for production of 30,000 domestic oil burners this quarter, for replacement and hardship cases. Manufacture of this type burner had been banned since April 15, 1942, and meanwhile stocks of producers and dealers have been exhausted.

★ ★ ★

A few makers of aluminum household ware have been authorized to resume production of a specified number of articles. Included in the list are: Hayward Non-Ferrous Foundry, Hayward, Calif.; J. C. Williams Aluminum Casting Co., Dallas, Tex.; West Bend Aluminum Co., West Bend, Miss. A new production quota of aluminum pressure canners allowed six manufacturers is 630,000, *compared with* 400,000 *for the eight months ended Sept.* 30.

★ ★ ★

HIGHER ceiling prices have been established by OPA on two groups of steel castings. Power shovel and locomotive crane castings, except shoes and treads, are up 6 per cent, and railway dump car and tank car castings are raised 17 per cent. New ceilings also are in effect on short orders not exceeding 200 pounds, including a $10 minimum price. The changes became effective Oct. 9.

★ ★ ★

The steel casting price regulation also has been altered to provide that quantity differentials be based upon the quantities ordered from one pattern by the same buyer "prior to the commencement of production" rather than on the basis of quantities ordered from one pattern "at one time." A new provision on freight absorption requires the producer to absorb the lowest applicable freight charges but, in no event, more than 50 *cents per* 100 *pounds.*

★ ★ ★

SOME slight changes have been made in price regulations affecting gray iron and malleable iron castings. One provision prohibits sellers who have been granted individual price relief from adding to this price an increase in maximum prices established for the industry generally through a later amendment of the regulation.

★ ★ ★

*A recent revision in MPR-*125 *(nonferrous castings) permits foundries to figure their metal costs on the basis of OPA ceiling prices instead of on current metal price. At the time the regulation first was issued metal prices generally were at the ceiling but this is no longer true, especially in the secondary market. Consequently, in view of restrictions on forward buying, it had become impossible in many instances for a seller to estimate accurately his metal costs for a casting to be produced* 60 *or* 90 *days later.*

★ ★ ★

CONSERVATION Division of WPB is being discontinued this month upon its own recommendation. At one time one of the most important agencies in the war production program, its passing reflects the fact that serious deficiencies in supply of many materials have been successfully overcome. A number of items still are in short supply, but remaining conservation efforts are to be handled by other WPB divisions.

★ ★ ★

The last Material Substitution and Supply List to be issued by the Conservation Division finds medium and small steel castings newly added to the list of items in insufficient supply for war and essential industrial demands. Malleable iron and automotive gray iron castings previously had been placed in this classification.

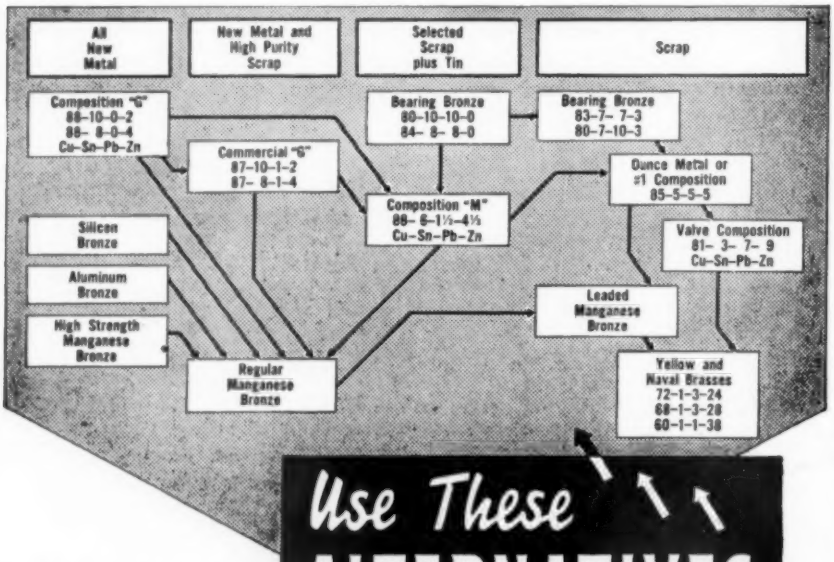
★ ★ ★

NO SMALL part of the job of getting Uncle Sam out of the war business after victory is the disposal of the hundreds of plants financed by the Defense Plant Corp. There are some 600 individual plants of this sort and 300 so-called "scrambled" plants—structures that were incorporated into previously existing plants. DPC already has plans and, in some cases, negotiations under way for the disposal of these properties, even though the plants still are engaged in war work and are not yet available to the prospective buyer.

★ ★ ★

Buying of DPC property is to be a wide

(*Concluded on page* 206)


All New Metal
New Metal and High Purity Scrap
Selected Scrap plus Tin
Scrap
Composition "G" 88–10–0–2 88– 8–0–4 Cu–Sn–Pb–Zn
Commercial "G" 87–10–1–2 87– 8–1–4
Bearing Bronze 80–10–10–0 84– 8– 8–0
Bearing Bronze 83–7– 7–3 80–7–10–3
Ounce Metal or #1 Composition 85–5–5–5
Composition "M" 88– 6–1½–4½ Cu–Sn–Pb–Zn
Valve Composition 81– 3– 7– 9 Cu–Sn–Pb–Zn
Silicon Bronze
Aluminum Bronze
High Strength Manganese Bronze
Leaded Manganese Bronze
Regular Manganese Bronze
Yellow and Naval Brasses 72–1–3–24 68–1–3–28 60–1–1–38

Use These ALTERNATIVES Wherever You Can

Notice how the arrows on the W.P.B. chart point to the *right*. . . . They show how alternative materials *currently available* can be utilized by foundrymen as now permitted by many designers. The purpose is to conserve primary metal at the mine through increased use of secondary ingots. Sometimes great ingenuity is called for, yet remember this:

The first program for scientific control of ingot metal was set up by Ajax 45 years ago. The result has been metal and practical technical follow-through in which Ajax increases your production by reducing rejects.

Send for booklet
"INGOT METALS OF TODAY"

16 STANDARD INGOT METALS BY AJAX

Ajax Tombasil
Ajax Plastic Bronze
Ajax Anti-Acid Bronze
Ajax Phosphor Bronze
Ajax Red Brass Ingots
Ajax Manganese Bronze
Ajax High-Tensile Manganese Bronze
Ajax Golden Glow Yellow Brass
Ajax-Hamilton Gear Bronze
Ajax Nickel-Copper 50-50%
Ajax Manganese Copper
Ajax Aluminum Alloys
Ajax Phosphor Copper
Ajax Silicon Copper
Ajax Nickel Alloys
Ajax Phosphor Tin

NOTE

"Proper Melting Decreases Foundry Losses," contains interesting data. Also, the booklet, "Nonferrous Ingot Metals of Today." Write for both of these. They are free.

THE **AJAX METAL COMPANY** PHILADELPHIA
ESTABLISHED 1880

ASSOCIATE COMPANIES:
AJAX ELECTRIC FURNACE CORP. Ajax-Wyatt Induction Furnaces for Melting
AJAX ELECTROTHERMIC CORP. Ajax-Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC. The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ENGINEERING CORP. Ajax-Tama-Wyatt Aluminum Melting Induction Furnaces

GRAY IRON FOUNDERS MEETING

(*Continued from page* 81)

gray iron castings are used, foundries may avoid those conditions which are prevalent immediately before almost every depression—over-expanded facilities, excessive extensions of credit, and over-accumulation of raw materials. He also urged gray iron foundries to co-operate with the bureau in supplying production statistics promptly when requested in order that accurate industry totals may be made available. Data previously issued on shipments of gray iron castings are being expanded to include regular releases showing production, unfilled orders and new orders.

Discussing "The Gray Iron Industry in the Postwar," Donald J. Reese, chief, Manufacture and Foundry Products Section, Metallurgical Branch, Steel Division, Washington, outlined the possible extent of competition that may be provided gray iron by other materials in coming peacetime markets. Although gray iron ranks second to steel as an engineering material from the standpoints of both actual use and production capacity, the gray iron industry must rely upon its own efforts to promote increased acceptance of its product, Mr. Reese pointed out. Other materials, he added, are processed in other forms and these other processors contribute to the popularizing of such materials in cast form. For instance, publicizing the desirable features of rolled and drawn steel, aluminum and brass react to the benefit of producers of castings of these same materials.

Based on Suitability

Mr. Reese is a strong advocate of the selection of the most suited engineering material and the most suited process of manufacture for every intended use, although he remarked that gray iron frequently is not selected on this basis and that many engineering departments of metalworking plants have outmoded data on this type of casting. Nevertheless, the fact that gray iron is used so widely means that any expansion of the industrial economy, even through more widespread application of relatively new and competitive materials, will react indirectly to the benefit of gray iron casting use. Mr. Reese also indicated that eventual use of gray iron will depend in large measure upon what steps are taken toward extending the marked improvements which have occurred in its properties in recent years.

Speaking at the Tuesday luncheon, Frank G. Steinebach, editor, THE FOUNDRY, traced the rising importance of gray iron castings in the war production program to its recent position as one of the most critical products. He attributed reluctance of war agencies to make earlier use of gray iron in larger amounts to failure of the industry to convey to Washington a true and complete picture of the properties and adaptability of its product. He urged the industry to take advantage of the increased recognition that has resulted from its part in war production and to make its peacetime position more secure by striving not only for improved quality but particularly for greater uniformity in quality.

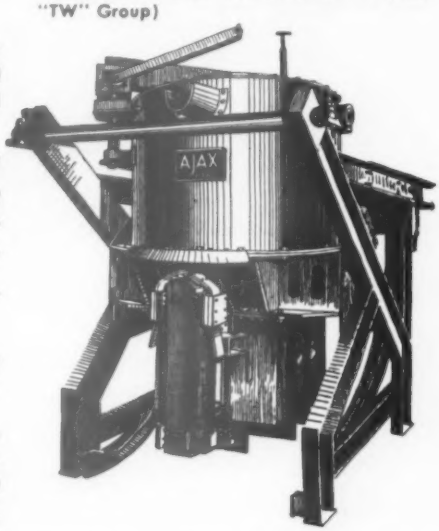
Messages from various government officials and industrial executives, conveying congratulations for the contributions of the gray iron foundry industry to the war effort, were read at the luncheon. The list included President Roosevelt, Governor John W. Bricker of Ohio, Lieut. Gen. Brehon Somervell of the Army Service Forces, Maj. Gen. L. H. Campbell Jr. of the Ordnance Department, Maury Maverick of the Smaller War Plants Corp., J. A. Krug of WPB, Vice Adm. Emory S. Land of the Maritime Commission, Paul V. McNutt of the War Manpower Commission, and Frances Perkins of the Department of Labor.

The necessity of adapting cost control systems to the changed conditions that will prevail after the war was stressed in a talk by Dr. Charles Reitell, Stevenson, Jordan & Harrison Inc., New York. He recommended that the society make a case study showing changes that result

PLANTS NOW MELTING ALUMINUM ALLOYS ELECTRICALLY ENJOY THESE SPECIFIC ADVANTAGES...

1. **VASTLY INCREASED PHYSICALS (tensile strength and elongation) in foundry, die-cast, or rolling mill products.**
2. **DECREASED GAS ABSORPTION AND SEGREGATIONS hitherto due to conventional melting practice.**
3. **CLEAN-CUT, ACCURATE TEMPERATURE CONTROL during the melting and pouring stages.**
4. **GREAT EASE AND SIMPLICITY IN HANDLING ALLOYS that were once considered sensitive and difficult to melt.**
5. **ELIMINATION of oxide inclusions.**
6. **COOL AND CLEAN foundry operations.**
7. **DELIVERY of the rated production per hour on the hour, (production capacity 300 lbs. to 1250 lbs. per hour).**

This is the first commercial electric furnace for melting aluminum alloys in continuous operation. It utilizes the famous Ajax-Wyatt low-frequency induction melting principle which has been applied successfully for nearly all wrought brass melted throughout the world. Write for new bulletins . . . (The "TW" Group)



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THE AJAX TAMA-WYATT INDUCTION MELTING FURNACE

ASSOCIATE COMPANIES: AJAX METAL COMPANY, Non-Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTROTHERMIC CORP., Ajax-Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting

in profits from variations in prices and volume. On the average, he added, a 5 per cent cut in prices requires a 25 per cent increase in volume to maintain profits. Dr. Reitell also suggested the development of simple cost control records and forms that will accommodate various conditions of prices and volume.

Part of one of the meeting sessions was devoted to a "Technical Problem Clinic" in which members of the society's technical committee participated. E. L. Roth, president, Motor Castings Co., Milwaukee, and chairman of the committee, presided, and other participants were: R. A. Flinn Jr., research metallurgist, American Brake Shoe Co., Mahwah, N. J.; Donald J. Reese, and A. J. Edgar, technical advisor, Gray Iron Founders' Society, Washington. Mr. Roth reported on recent activities of the committee, including the establishment of an award for the best papers prepared at engineering schools on the subject of gray iron. He also announced that the committee had adopted an understandable definition of gray iron. This definition, intended to overcome some of the misconceptions regarding the product, is: "Gray iron is an iron-carbon-silicon alloy, similar to steel. Its annual production is greater than the sum total production of all engineering materials except steel."

Mr. Flinn, speaking on "Research Develops Gray Iron," emphasized that the research department should be regarded as an integral part of an organization, just as the sales and manufacturing departments are considered, and not as an extravagent plaything. Mr. Reese read a paper prepared by W. W. Levi, metallurgist, Lynchburg Foundry Co., Lynchburg, Va., in which the various steps in the transition of castings in the experimental state to commercial production were discussed. Mr. Edgar stressed the importance for a trade association to safeguard its industry's interests through the medium of technical investigation. A question-and-answer period concluded the panel session.

A comprehensive review of the history of the Gray Iron Founders' Society and its predecessor, the Gray Iron Institute, during the past 16 years was included in the address and annual report by W. W. Rose, executive vice president of the society, who has been identified with the organization since January, 1936. Mr. Rose discussed in detail the various activities of the society, including government contacts, costing, technical progress, publicity and education, statistical studies and marketing information.

Improving Foundry Production

The important role of mechanization in improving quality and quantity of foundry production was treated in a paper by Kennard Lange, foundry engineer, Link-Belt Co., Chicago. Mr. Lange described various equipment for handling sand and molds and their adaptability to different sizes and types of plants. He recommended that foundries considering plant mechanization develop an overall plan that will permit adjustments as the installation progresses.

Lieut. Comm. Lester B. Knight, Bureau of Ships, Navy Department, Washington, and formerly sales manager of National Engineering Co., Chicago, emphasized the need for watching the good housekeeping aspects of foundry mechanization. He pointed out that poor housekeeping invariably results in higher costs and lower quality, but he added that a disorderly plant without mechanical equipment will probably be a disorderly plant with mechanical equipment despite the fact that such equipment does help to effect a clean, orderly shop.

Commander Knight suggested that photos be taken of the various departments of a foundry every 6 months. After the first set of pictures, the improved housekeeping will become immediately obvious, and the second and third sets will, in most cases, firmly establish the routines which result in good housekeeping.

A discussion of future markets for gray iron, presented by Edward C. Hoenicke, assistant to the general manager, Foundry Division, Eaton Mfg. Co., Detroit and Vassar, Mich., pointed out the large pentup demand for those manufactured products in which gray iron castings commonly are used. These include automobiles, railroad equipment, mining equipment, domestic appliances and homes. He also stated that the

(*Continued on page* 204)

Now ready! NEW FOUNDRY BENTONITE *Hand Book*

Pocket size. Leather cover. Contains tables, formulas and other reference data.

EVERY FOUNDRYMAN can profitably use this book ... which presents the experience of engineers who have specialized in Foundry sand. It contains recommended sand mixes, adapted to all types of gray iron, malleable and steel castings. Every mix presented has been thoroughly proved in practice.

Schundler Bentonite is strictly a laboratory controlled product and is especially "tailored" for Foundry use.

Schundler Bentonite is sold with a complete technical service fitted to your individual needs. This service is available upon request. Write today for your free copy of the new Foundry Bentonite Handbook.

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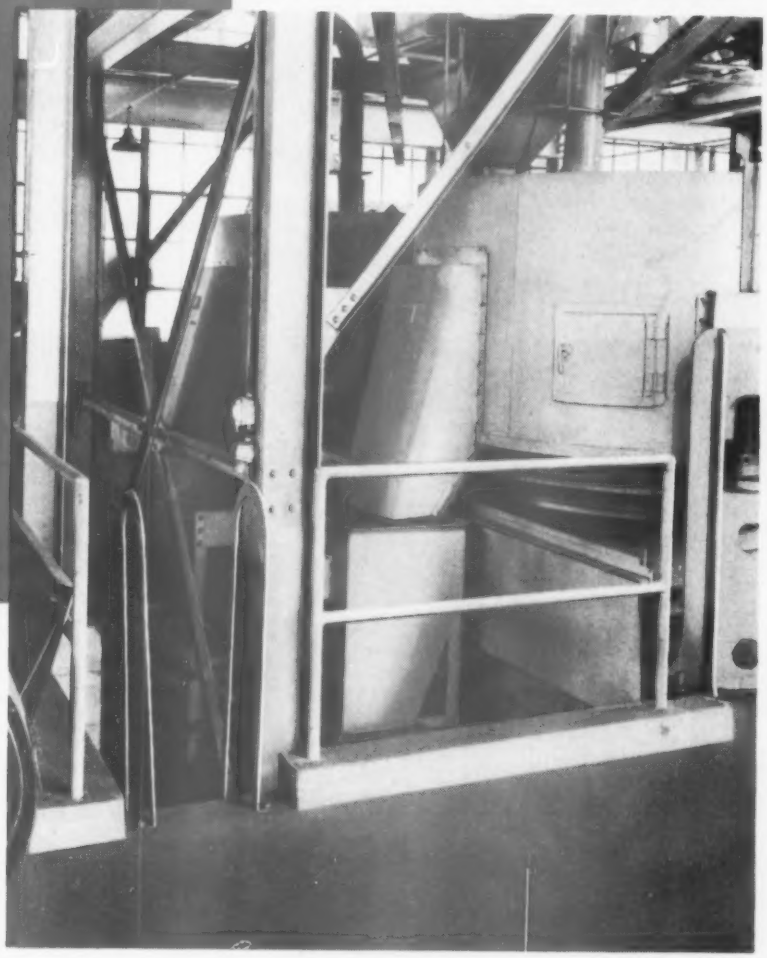
CLEARFIELD MIXERS

MAY BE SUPPLIED WITH VARIOUS ACCESSORIES

including:

- Dust Hoods and Exhausters
- Ammeters for determining size of charge
- Water and Oil Meters to measure moisture additions
- Electric Timing Devices for automatic control of the mixing cycle.



Two 930 Clearfield Mixers in a modern Gray iron production foundry. The entire mixing cycle of each unit is controlled by electric time switches which may be set to charge any desired amounts of materials and operate for any length of tempering period.

Control units are mounted on panel boards, one of which is shown at left.

CLEARFIELD MIXERS IN ALL CAPACITIES FIT READILY INTO ANY TYPE OF SAND PREPARING LAYOUT

CLEARFIELD MACHINE COMPANY

CLEARFIELD PENNSYLVANIA, U. S. A.

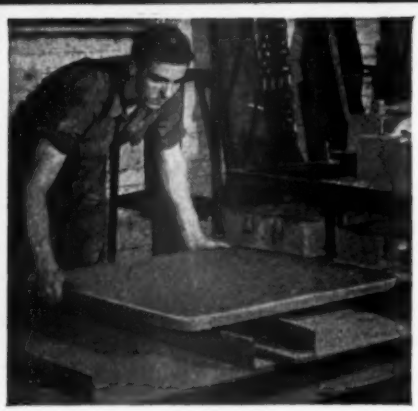
(*Continued from page* 202)

quality and performance of gray iron castings appears to have vast untapped possibilities, some of these being in the field of alloys, new production technique, heat treatment, etc.—all of which eventually should react to the benefit of the industry as a whole. Mr. Hoenicke urged the industry to improve its merchandising methods, its weakest link in the past.

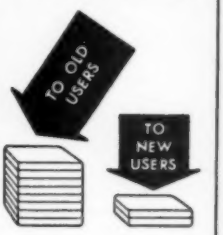
Value of wage incentive plans in increasing foundry production was described in a paper, "Job Evaluation and Wage Incentives," by W. B. Estes, Cleveland regional manager, Management Consultant Division, WPB. He stated that a true, fair, workable and approvable wage incentive plan should be carefully and thoroughly engineered, geared and maintained under constant management to standards that actually represent a sound and fair starting point for incentive earnings to begin. An important factor essential to its success is that it be understood by all parties involved, and that both management and workers be in full accord as to its desirability.

Brig. Gen. Henry J. Reilly, O.R.C. spoke at the Wednesday luncheon session, discussing the general war situation.

USERS COME BACK FOR MORE!



8 OUT OF 10 TRANSITE CORE PLATE USERS ARE REPEAT CUSTOMERS!



IT'S EASY to figure out why—once they give Johns-Manville's Transite Core Plates a try—foundries keep coming back for more. Here are the answers:

Light Weight: Transite Core Plates light weight means easier handling, increased production.

Less Breakage: Their fibrous nature provides unusual shock resistance, minimizes breaking and cracking.

Easily Cleaned: Transite Core Plates are actually self-cleaning when both sides are used alternately.

Economical: These J-M plates combine low initial price, low handling costs and long life.

Low Warpage: Maximum warpage on plates under 24" is 1/64" on either dimension. On plates over 24" warpage will not exceed 1/64" in 24" length and width.

Corrosion-Resistant: These Transite plates are made of an asbestos and cement combination. They cannot corrode.

Non-Metallic: No critical materials used.

For full details, write for Brochure PP-10A. Johns-Manville, 22 East 40th Street, New York 16, New York.

JM

Johns-Manville

TRANSITE Core Plates

RESOLUTIONS ON THE GRAY IRON FOUNDRY INDUSTRY, ADOPTED BY THE MEMBERS OF THE GRAY IRON FOUNDERS SOCIETY IN ANNUAL MEETING—OCT. 10-11, 1944. CINCINNATI, O.

WHEREAS, the gray iron foundry industry of the United States is composed of some 3000 individual businesses extending thruout all of the states of the Union, and with a capacity of close to 30,000,000 tons of gray iron castings annually; and

WHEREAS, the products of the gray iron foundry industry have been, are and will continue to be basic and vital to the domestic economy, the development and maintenance of the Capital Goods Industries generally and currently to the promotion of the war effort in which we are involved; and

WHEREAS, the gray iron foundry industry has come to occupy such a position by reason of the strength, initiative and individual business capacity of its members functioning under a free economy and with a minimum of government regulation; and

WHEREAS, the Gray Iron Founders Society is generally recognized as the representative of the business interests of that industry; NOW, THEREFORE,

We, the members of the Gray Iron Founders Society in annual meeting assembled on October 11, 1944, in the City of Cincinnati do hereby

RESOLVE, That

WHEREAS: The gray iron foundry industry is operating under Maximum Price Regulation Number 244 and WHEREAS: It is the sense of this meeting that many foundries are in need of relief and have not taken advantage of relief measures provided in the regulation, FURTHER: that failure to avail themselves of relief measures is due to a lack of understanding of the regulation as amended on the part of many in the industry, and WHEREAS: It is the belief of those present that this situation can be improved if proper steps are taken therefore be it

RESOLVED: That the Office of Price Administration be urged to cooperate in a campaign of publicity for the purpose of clarifying the regulation in such language that it may be more readily understood; and That special emphasis be placed upon the explanation and use of the various relief measures and methods used in applying for relief;

And be it further Resolved; That the Office of Price Administration use every effort to simplify the forms required in filing for relief under the regulation;

And be it further Resolved: That the Office of Price Administration issue necessary instructions to all regional offices in order to provide them with all the information required to give proper aid and advice to members of the industry regarding price relief under regulation No. 244 and the methods used in applications for Price relief;

And be it further Resolved: That with respect to the four (4%) percent profit criteria of the Office of Price Administration for the gray iron foundry industry, that it is the opinion of this Society that such criteria does not put the industry in a position to meet either current or postwar reconversion of plant and equipment,

And be it further Resolved: That members of the industry here present cooperate in every way possible in order to attain these objectives at the earliest possible moment.

With respect to the War Labor Board, the War Production Board, and the OPA.

WHEREAS, from a recent hearing of the Regional War Labor Board in Chicago it was disclosed that certain confidential information which had been submitted by the industry to the War Production Board had been made available to certain interested parties and made public by such parties thru the medium of a confidential document entitled: "The Foundry Industry and the War"; and

WHEREAS, it has been reported and verified that certain interested parties have had access to a preliminary and confidential study of the steel industry by the O.P.A., parts of which have also been made public by such interested parties; and

WHEREAS, A Report of the Temporary

(*Concluded on page* 206)

How this DESPATCH Oven Layout Provides..

FOR MAXIMUM EFFICIENCY in core production, it's hard to beat this straight-as-an-arrow Despatch oven layout. A glance at the drawing (based on a Despatch installation in a midwest foundry) tells the story.

SAVES FLOORSPACE. Assures most core output per foot of floorspace by use of Despatch vertical conveyor oven and well-planned arrangement of coremakers. Entire layout is compact.

BOOSTS COREMAKERS OUTPUT. Coremakers simply "turn in their tracks" to place cores on roller conveyor. Saves walking to oven, avoids confusion and increases each coremaker's output.

CUTS BAKING TIME. Fast-baking oven allows rapid production. High volume Despatch oil-fired system recirculates up to 75% of heated air. Ovens of this type are available for baking up to 10,000 lbs. of cores per hour.

WE'LL HELP YOU PLAN modifications and improvements of your coreroom layout. No obligation. Ovens of any size or capacity to fit your new layout. Write to "Despatch Engineering Service" today!

DESPATCH CAR OVEN

DESPATCH RACK OVEN

DESPATCH DRAWER OVEN

DESPATCH OVEN COMPANY MINNEAPOLIS

(*Concluded from page 204*)

National Economic Committee, Monograph No. 15, of which Senator O'Mahoney was chairman, states in its report on "Financial Characteristics of American Manufacturing Corporations" that some 1300 income tax returns of small corporations were removed from the files of the Bureau of Internal Revenue and turned over to a special committee of the Work Projects Administration for examination; and

WHEREAS, These acts are plainly a breach of confidence of the basis on which such data and information was supplied by the industry, BE IT THEREFORE,

RESOLVED; That the gray iron foundry industry deplores such practices and urges that these and all government agencies cease forthwith the distribution of such confidential reports and that the sanctity of confidential reports and returns, departmental studies and departmental reports be respected and not, as heretofore used by or released or made available to interests not specifically entitled to same.

STATISTICAL DATA

WHEREAS, with respect to the furnishing by the gray iron foundry industry of commercial data, labor statistics and financial statistics as solicited by the various government agencies, such as the Department of Commerce, the Bureau of Labor Statistics and the Office of Price Administration, it is recognized that compilation of partial information may be harmful to the industry but that statistics based on reports from a large percentage of the industry may be helpful to those Committees of the industry seeking relief based upon such facts, BE IT

RESOLVED: that this Society recommends that the individual members of the industry furnish full and complete reports as called for by the government agencies in response to such questionnaires.

TO THE STAFF AND OFFICERS OF THE GRAY IRON FOUNDERS SOCIETY

WHEREAS, the increasing problems involved as between the gray iron foundry industry and the various government bureaus and agencies is requiring an increasing amount of individual effort and time on the part of the various officers of this Society; and

WHEREAS, The Staff of the Society has devoted itself unstintingly to the objectives of the Society and to the benefit of the industry, NOW THEREFORE BE IT

RESOLVED, That the members of the Society express their appreciation to the Staff of the Gray Iron Founders Society for its efforts to these objectives during the preceding year and

BE IT FURTHER RESOLVED; that the members of the Society extend their appreciation to the retiring officers of the Society for their devotion to the duties of their offices and the interests of the industry during the preceding year; and

BE IT FURTHER RESOLVED; That individually and collectively the members of the Gray Iron Founders Society extend their fullest assurances of co-operation and support to the activities of the Gray Iron Founders Society and to its officers during the coming year, in order that the efforts of the individual members of the industry on their own behalf may be supplemented and unified by the collective united efforts of the industry as a whole, functioning thru the Gray Iron Founders Society as the only organized Association of Gray Iron Foundry executives capable of meeting the increasing problems of a controlled economy and of increasing centralized government regulation. In unity there is strength—this industry needs that unity and strength as never before.

BY THE RESOLUTIONS COMMITTEE OF THE GRAY IRON FOUNDERS SOCIETY
C. R. Culling, R. E. Kercher, W. D. Leonard, C. B. Magrath, A. B. Root, chairman.

PREWAR QUALITY—
QUICK DELIVERIES—
LOW ULTIMATE COST!

Wartime scarcities are forcing many belt manufacturers to use substitute materials resulting in lowered quality; also deliveries are slow in general.

Contrasted to this is the fortunate position of the Imperial Belting Company who, forseeing scarcities, early contracted for volume purchases of raw materials sufficient to maintain quality at prewar standards throughout hostilities. The SAHARA and REXALL belts, currently produced, are exactly the same as prewar belts.

Deliveries are prompt so far (we have many letters of appreciation for our delivery service) but heavy sales volume and recent critical developments with cotton duck will soon interfere. We strongly urge forward purchases for your protection.

The evidence of SAHARA and REXALL efficiency is our performance records. They are yours for the asking.

IMPERIAL BELTING COMPANY
1750 S. KILBOURN CHICAGO 23, ILL.

Washington Notes

(*Concluded from page 200*)

open affair; despite the fact the corporation which built and has operated a plant may be interested in acquiring it, outsiders will be given the same opportunity as the lessee to dicker for its purchase. Short-term leases may be resorted to in the case of property difficult to sell. Engineering surveys and catalogs describing all government owned plants are supposed to be available soon, and some advertisements detailing property for which sales negotiations are in process have appeared recently.

★ ★ ★

SOME war plants, equipment and material will find little if any peacetime use. This is true of such facilities as powder plants and of such equipment as special, single-purpose machine tools. Used material also presents a problem and the only solution frequently is to junk it.

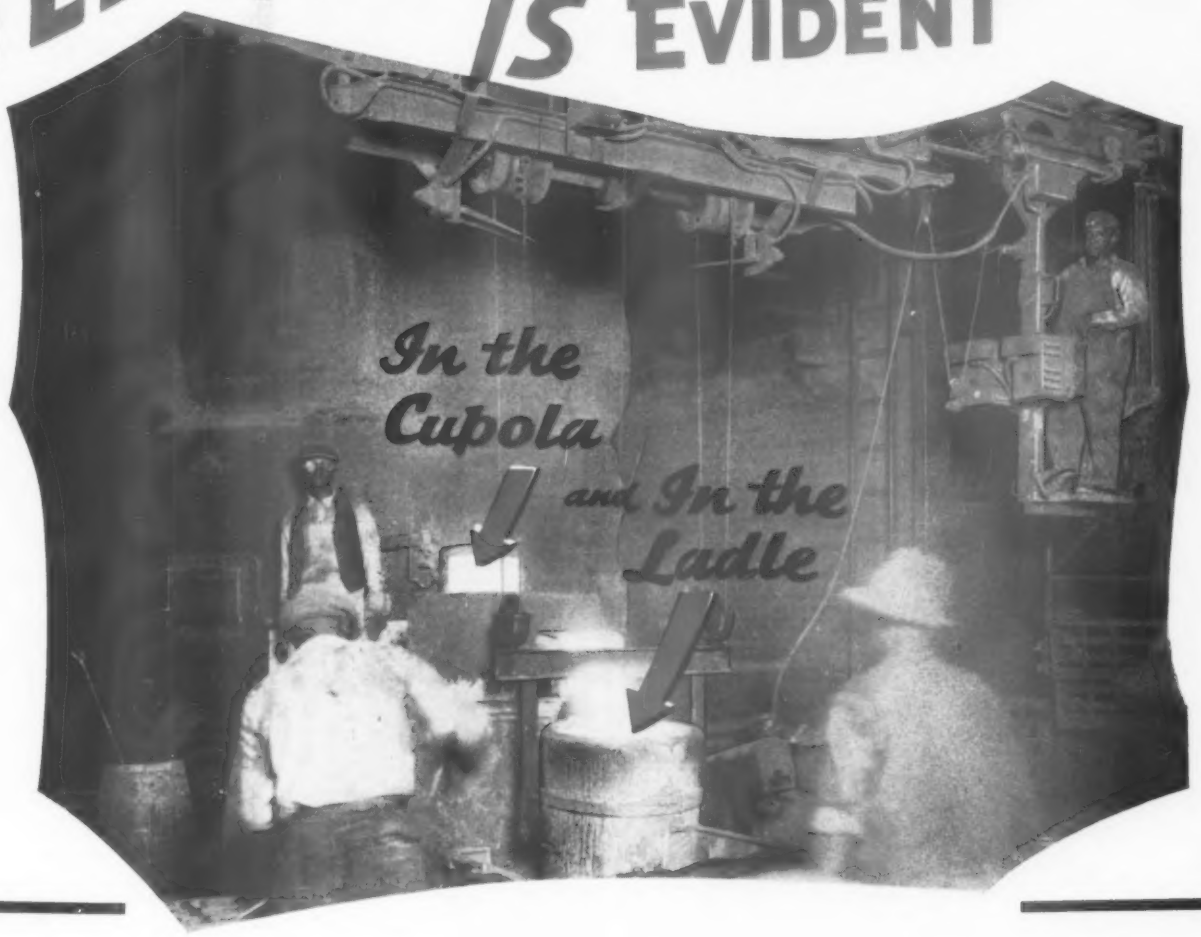
★ ★ ★

Surplus war property disposed of so far represents only a trickle of the eventual flow but it is growing. In August, latest month reported, dispositions amounted to nearly $28 million, up $11 million from July, but inventories in the hands of disposal agencies at the end of the month amounted to $348 million and shortly are expected to be close to $1 billion. Property sold in August brought 72 per cent of cost or appraised value.

W.G.G.

Brown Instrument Co., Philadelphia, has been awarded the National Security Award by the Office of Civilian Defense for outstanding wartime security measures.

YES..DEFINITE IMPROVEMENT *IS* EVIDENT

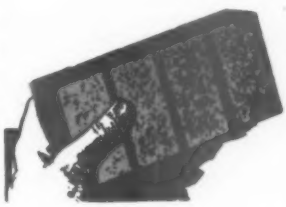


TODAY sand, dirt, iron oxides, oxides of silicon, coke ash and refractory particles are present in cupolas in greater than normal quantities.

Obviously these impurities must be made highly fluid and drawn off in the slag or they will adversely affect cupola, iron and castings.

Famous Cornell Cupola Flux has been performing this important function for over 25 years. Where it is used consistently, definite improvements are evident.

The slag hole is more active. Hotter, purer iron flows from the cupola. Ladles take on a glazed surface and require less conditioning. But the most valuable results are obtained in stronger, more machineable, more salable castings.



Get literature and the complete story of this long accepted foundry flux. Don't delay getting its many benefits.

The CLEVELAND FLUX *Co.*

Manufacturers of Iron, Brass and Aluminum Flux Since 1918

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CLEVELAND, OHIO

COREMAKING TIME STANDARDS FOR JOB SHOPS

(*Continued from page* 80)

fill, bump (or jolt ram), peen with a stick (one level only), butt ram, and strike were found through observation to be the basic elements of every core. A lump sum of the separate times for these elements was compiled for each volume factor forming the base time for the core. This information was set up in graph form, as shown in Fig. 2, and later in table form.

In some core boxes, two or more stick peens are necessary. To set a standard time for these extra peens (Fig. 3), an area factor was set by multiplying the extreme length of a core by the extreme width. Peens are figured per level. In the case of very shallow cores where no peen is necessary, the time allowance for an extra peen is subtracted from the base time for the core. A finger peen is the same as a stick peen less 0.02-minute, which is the *pick-up tool* allowance.

Three classifications of draw (Fig. 3) are used, namely: Easy draw, medium draw, and hard draw. The draw is set as a function of the volume factor. An easy draw includes those cores which do not have close tolerances and which have boxes having adequate draft, as indicated in Fig. 4. In cores with an easy draw, little rapping or patching is required. A core with a medium draw requires more rapping due to thin sections, pockets, or very little draft in the box, as shown in Fig. 5.

Most cores observed fall into this classification. A core requiring a difficult draw is defined as a core which is held to very close tolerances, has very thin or unsupported sections, or has to be drawn at an angle due to back draft on one side. The ring core box shown in Fig. 6 is an example of a difficult draw. A split box has an easy plus a medium draw allowance.

The operation roll to board or plate is set as a function of the area factor as indicated in Fig. 3. Elements such as clamping, clean and kerosene box, paste and set chills, set rods and wires, and venting are set as separate considerations from standards.

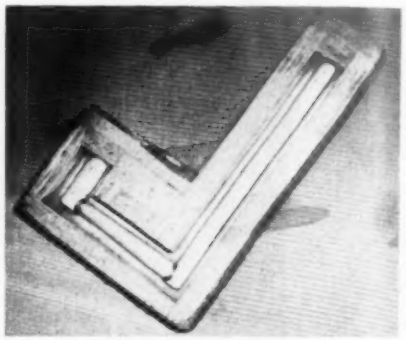


Fig. 4—One-half of gate corebox is example of easy draw

Wires are defined as being under ¼-inch in diameter. Nails fall into this class. Bends in wires are paid for per bend; "easy" and "hard" bends are classified according to the section in which the wire must be set. Rods are defined as being ¼-inch in diameter and over. They are considered in the same manner as wires. However, more allowance is made for bends due to tougher material. Time

(*Concluded on page* 210)

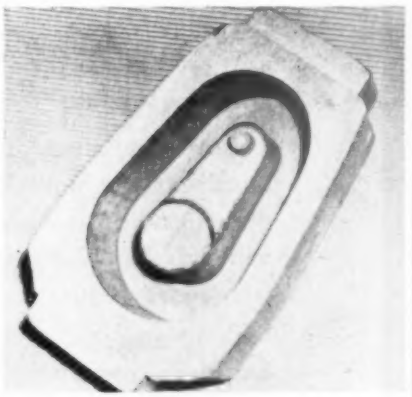
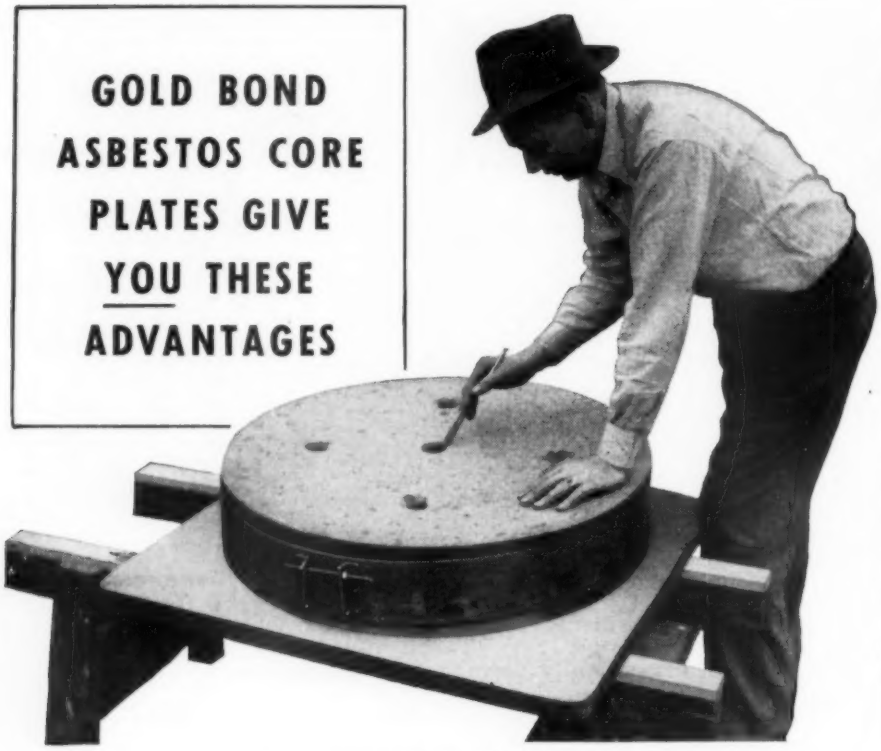


Fig. 5—Pouring cup is example of medium draw. Despite adequate draft, depth of box makes draw more difficult

GOLD BOND ASBESTOS CORE PLATES GIVE YOU THESE ADVANTAGES



COURTESY OF METAL & ALLOY SPECIALTIES CO., INC., BUFFALO, N. Y.

LIGHT WEIGHT—Only ¼ as heavy as steel or iron plates of similar thickness.

NON-CORRODIBLE—Will not rust or corrode like metal.

MINIMUM WARPAGE—As low as cast iron and much less than plates from ordinary stock steel. Tolerance not over 0.0156 in 24" length.

LOW HEAT TRANSMISSION—Lower than metal—greater uniformity of temperature over the entire surface.

MAINTENANCE—Foreign substances do not readily adhere to surfaces as they do to metal plates. If, after long service, these plates require truing, they can be run on a surface grinder or rubbing wheel.

BREAKAGE—Less than slate, plaster of paris, glass and similar materials. Will not crack or break as readily as cast iron if accidentally dropped.

COMPOSITION—These are *not* laminated plates. Will not peel or separate. Rounded corners help prevent corner chipping or bending.

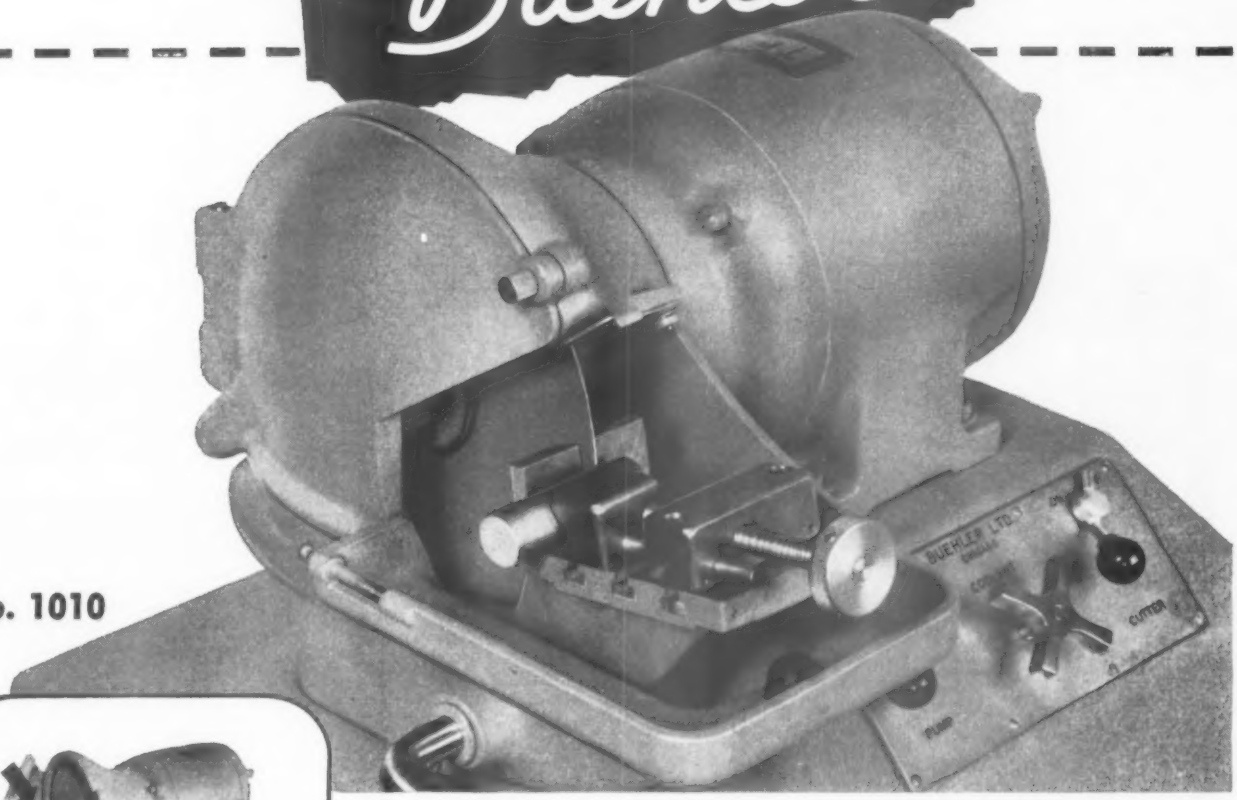
ECONOMY—Gold Bond Asbestos Core Plates are economical because of their low first cost, long life, low breakage, freedom from corrosion, low warpage, low maintenance cost and saving in labor fatigue.

Gold Bond FOUNDRY PRODUCTS

ROCK WOOL INSULATION . . . RAW DOLOMITE . . . CASTING PLASTER . . . NON-SILICA PARTING BASE

NATIONAL GYPSUM COMPANY, BUFFALO 2, NEW YORK

Buehler



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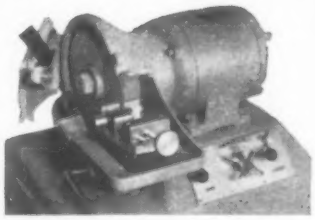

Splash guard opened showing jet pipe for coolant; a companion jet is on the opposite side of the wheel.

Complete view of cabinet showing storage bin for extra wheels and tools.

NEW 1 H. P. Cut-Off Machine

A laboratory size cutter with ample power for fast cutting of samples up to 1" in diameter.

This cut-off machine is built with the usual Buehler emphasis on precision in both the construction of the machine itself and the work it performs. The controls are arranged for the utmost convenience of the operator—a feature that contributes to speed and accuracy in cutting samples.

The cutting wheel mounted directly on the ball bearing motor shaft is free from side play or vibration and is cooled by a stream of coolant directed on both sides of the wheel under the guard.

The cutting is done on the front of the wheel by using the long lever handle to raise the clamp base holding the sample to contact the wheel. This mechanism is balanced so that pressure against the cutting wheel is under perfect control at all times by the operator. A metal splash guard, removed in the illustration, furnishes protection from spray.

Overall dimensions are 24" x 28" x 50". Shipping weight, 575 lbs.

THE BUEHLER LINE OF SPECIMEN PREPARATION EQUIPMENT INCLUDES . . .
CUT-OFF MACHINES • SPECIMEN MOUNT PRESSES • POWER GRINDERS
EMERY PAPER GRINDERS • HAND GRINDERS • BELT SURFACERS
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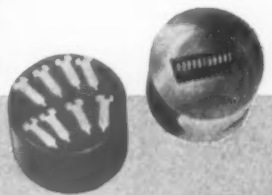

METALLURGICAL APPARATUS
165 WEST WACKER DRIVE, CHICAGO 1, ILLINOIS

(*Concluded from page 208*)

for getting and cutting is included in the time allowance due to the fact that at Ampco Metal Inc., coremakers are required to perform this function.

Venting is classified into two basic types, namely: Stick venting and scratch venting. The number of stick vents for a given area is standardized and time set per vent with an extra allowance set for a stick vent over 1 inch in depth. Standard time for scratch vents is set per lineal inch.

Standard time for pasting chills or for greentopping is set per spot or per lineal inch of paste depending on the method of pasting used by the coremaker. The *carry plate to rack* allowance is to be divided by the number of cores per plate to arrive at the standard time per core.

The *dust* box and the *kerosene and blow* box allowances are divided by the number of cores that can be run in the interval between these operations.

The draw allowances for loose pieces are classified as "easy" and "hard." Different time is allowed for drawing the loose piece before the box is drawn than is allowed for drawing the loose piece after the box is drawn. Setting a nail to draw a loose piece is compensated by an extra time allowance. Allowances are also made for assembling a loose piece in the core box and for cleaning the loose piece with kerosene.

To summarize, the factors considered in Ampco Metal's standards are as follows:

1. Base or Standard Elements (including fill, bump, peen, butt ram, and strike.)
2. Rap and draw.
3. Extra stick peens.
4. Extra finger peens.
5. Roll core to plate.
6. Wires (and nails).
7. Rods.
8. Stick vents.
9. Scratch vents.
10. Greentopping.
11. Pasting chills.
12. Pasting for greentopping.
13. Carrying plate to rack.
14. Clamping.
15. Setting chills.
16. Cleaning box with kerosene and blowing out box.
17. Dusting box.
18. Handling loose pieces.

Elements not considered in this list, such as bedding, driers and coke venting, are to be added to the standard time allowance by taking an actual physical time study of the element. If such an element should occur frequently, a standard time allowance should be set and the element time incorporated into the standards. The standards as set up are not rigid and may be added to or changed to fully compensate for all work done by the coremaker on a core.

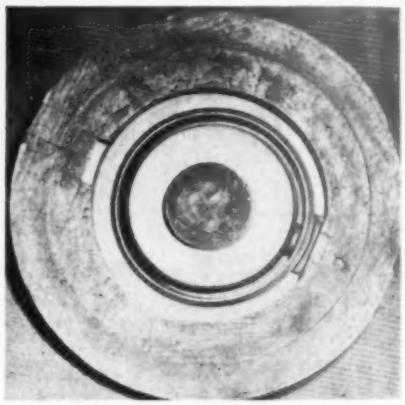

Fig. 6—Depth of ring and small section thickness make core extremely difficult to draw without excessive patching

It is the belief of the time study department at Ampco Metal Inc., that through standardization of time allowances the workman is offered equality of opportunity while at the same time greatly increasing production for the war effort.

Film Depicts Fire Prevention

Walter Kidde & Co., New York, is making available to industrial plants and other groups concerned with first aid fire-fighting, its 20-minute, 16 mm. sound film "Flame Facts," through Princeton Film Center, Princeton, N. J., distributing agents.

For BETTER FOUNDRY SERVICE

The *Clear-Vue* MODEL **DUSTFOE RESPIRATOR**

- Attractive Appearance.
- All-Plastic Facepiece and Filter Container.
- Lightweight—Compact—Comfortable.
- Approved by U.S. Bureau of Mines for Protection against All Dusts.
- Transparent—filter seal, etc., can be checked without disassembly.

Now made of strong, *transparent* plastic—compact, durable, odorless, non-corrosive, non-conductive of heat or electricity—the Clear-Vue Dustfoe Respirator retains its original advanced design features while providing new practicality in foundry service. Condition of filter, filter type, adjustment, seal, and state of cleanliness can be checked at a glance without disassembly. Get the facts in Bulletin No. CM-6!

MINE SAFETY APPLIANCES CO.

BRADDOCK, THOMAS AND MEADE STREETS · PITTSBURGH, PA.

District Representatives in Principal Cities

Helping overcome aluminum addition problems in basic steels . . .

Simanal*

• 20% SILICON • 20% MANGANESE • 20% ALUMINUM

SIMANAL ADVANTAGES

- Controls Alumina, Silica, and Alumina Silicate inclusions by introducing Manganese Oxide.
- Produces globular inclusion.
- Better distribution of inclusions.
- Uniformity from heat to heat.
- Grain size control.
- Production of cleaner steels.

The use of straight aluminum in deoxidizing of certain steels has not always produced desirable grain structures or well-distributed inclusions. But a ferro-alloy of 20% each Silicon, Manganese, and Aluminum called *Simanal* has solved many steelmakers' problems of aluminum addition and given improved control of grain structure and inclusions.

Simanal may be ideally adapted to your requirements. The Ohio Ferro-Alloys Corporation will be pleased to assist in your test application.

* *Especially advantageous where medium carbon ferro-manganese is required.*

FERRO-SILICON 50%, 75%, 85%, 90%
FERRO-CHROMIUM • FERRO-MANGANESE
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BRIQUETS
SILICON • MANGANESE • CHROME

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PHILO RAINIER

Ohio Ferro-Alloys Corporation
Canton, Ohio

Chicago Detroit Pittsburgh San Francisco Tacoma

MODERN FOUNDRY ARCHITECTURE

(*Continued from Page 87*)

plant.

Food is brought to the ten lunchrooms from a commissary building, 98 x 62 feet, which is of reinforced concrete and brick construction. This building houses the kitchen, storage room, wagon room, toilets and lockers.

The personnel building, 125 x 80 feet, is of steel frame and brick walls, one story high. It houses the employment department, plant police, first aid and a hospital unit.

The office building, 150 x 60 feet, is built of reinforced concrete and brick, as are all subsidiary buildings except the boiler house. The office building is two stories and basement. In the basement is a garage which accommodates up to 12 cars, a kitchen, dining room, toilets and room for mechanical equipment. The first and second floors are devoted to offices.

Other subsidiary buildings include an oxyacetylene house where gas of this type is made for use in the plant, an oxygen tank house, fuel oil tanks, fuel oil pump house, pump and screen house, oil house, and boiler house.

The boiler house is of concrete frame to the boiler room floor, with steel frame, brick and sash above that. Coal bunkers are of concrete, as also are those for pig iron and scrap. Stacks are of the induced-draft type, 18 feet high. Platforms are of concrete and ladders are of wood.

Boiler house equipment, including several 60,000-pound per-hour boilers, provides steam principally for driving air compressors and for heating purposes. Coal is delivered in railroad cars to a track hopper, from which it is conveyed to a coal bunker above the boilers. A weigh larry receives the coal from the bottom of the bunker at several points along the full length of the boiler house and discharges it to the stoker hoppers in front of the boilers.

Ashes are removed by an automatic pneumatic ash conveyor system and delivered to an outside ash storage tank which is equipped for either truck or railroad car unloading.

The air compressor engines are designed for either condensing or non-condensing operation, depending on the amount of exhaust steam required in the process work. Condensers are of the barometric type, with water supplied by pumps from the nearby canal. All condenser cooling water is screened through a traveling water screen before it reaches the water circulating pumps. Cooling water and condensate from the condenser tail pipes are returned to the canal at a point down stream.

The main heating line is supplied with exhaust steam from the compressors and is piped through an underground tunnel into the main building. Entering the cleaning and finishing sections this line rises to the ceiling, and distribution from this point extends throughout the plant. At times when there is insufficient exhaust steam, an auxiliary high-pressure line which cross-connects to the ends of the heating main is used to provide ample pressure. Processing steam used in the plant is also provided from the high-pressure line.

Due to lack of overhead space, it was necessary to run the return mains through the double columns along the outside walls. This necessitated cutting a slot through the supporting web between the columns and required use of corrugated expansion joints in the return mains, as no other type was practical under the circumstances. All condensate goes to condensate pumping receivers located in the locker room units, whence it is pumped through the tunnel back to the boilers.

Along the walls of the building, high-velocity, blower-type unit heaters are suspended from the bottom of the crane rails; in the center of the cleaning and finishing wings, vertical projection unit heaters of special design are used, mounted about 50 feet above the floor. This type is also used in the open-hearth building where the heaters are mounted over the charging room floor.

Provide Ample Ventilation

Ventilation is provided by roof exhaust units, each having a capacity of 20,000 cubic feet per minute and spaced to serve about 1800 square feet of floor area, except over the pouring floor, where their capacity is 40,000 cubic feet per minute.

Vertical unit heaters are used in the maintenance building, and all locker and toilet room units are provided with hot-blast heating and exhaust equipment. The laboratory is heated by radiators and is provided with an exhaust for chemical fumes. The office and personnel buildings both are heated by convector-type radiators. Basement of the office building includes a machine room with equipment for year-around ventilation of the entire building and a separate unit for the cafeteria. In the first aid department of the personnel building air is exhausted by a 2000-cubic-foot-per minute unit and replaced by another unit of 2200-cubic-foot capacity. There are also fans in the toilet rooms.

Light and power for the plant are provided by one master transformer station and ten substations, the latter being located at different points in the foundry and adjacent buildings. Incoming primary voltage is 34,500 volts and the secondary is 4160 volts. Power voltage for machines and utility motors is 440 volts; that for light is 120/208 volts.

The master transformer station comprises an outdoor structure carrying two overhead 34,500-volt primary lines to

(*Continued on Page 214*)

Alnor

PYROMETERS

Type RK

Designed for heavy duty industrial uses, Alnor Pyrometers give you consistent accuracy and convenient installation for any type of foundry temperature measurements. Type RK is a two-circuit surface mounting type designed for simple conduit wiring at back or bottom of the case. It is ideally suited to use with industrial furnaces, heat treating, molding and similar equipment. A wide range of thermo-couples is available to suit any individual requirements. Type RK is but one of the complete line of Alnor Pyrometers. Write for descriptive bulletins.

ILLINOIS TESTING LABORATORIES, INC.
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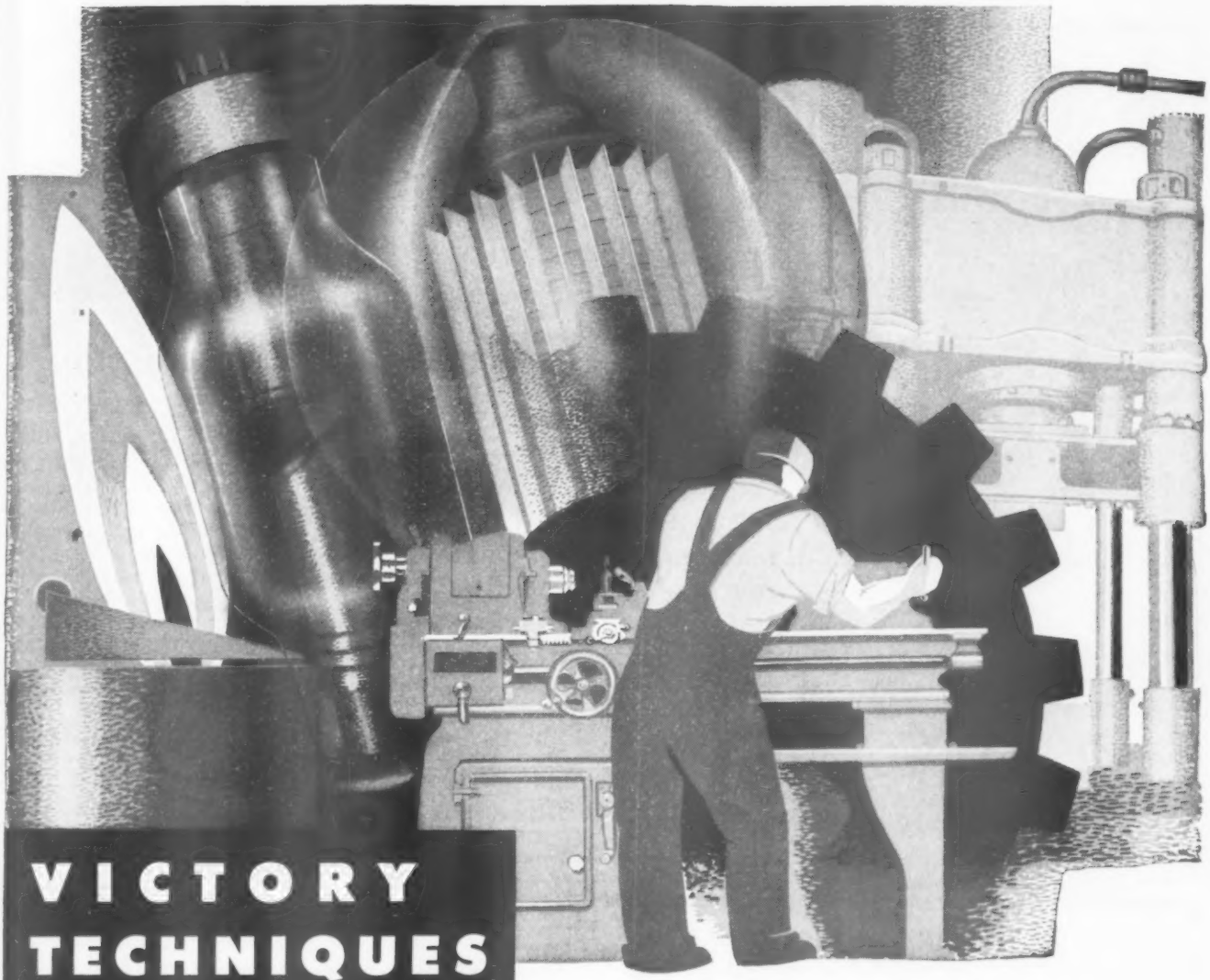

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The magnificent production achievement of a Free America that overcame a ten-year start and overwhelmed the axis with ships, planes, arms and ammunition, *moved industry ahead fifty years.*

Peacetime production will be unable to compete without the Victory Techniques that helped to win the war and obsoleted much of our prewar facilities. For the truth of the matter is that with a need so great, unlimited amounts of money and energy went into the development of new materials, new fabricating processes, new metallurgical treatments, new assembly methods and new transportation facilities.

The competitive pace of peacetime production will be so fast that if you do not know these new Victory Techniques, you simply can not survive. Shrouded with wartime secrecy they are coming to light one by one.

Learn what they are *now*. See your machine tool representative, your electrical equipment man, your heat-treating furnace salesman, your representatives for materials and services of every kind. Find out what changes in every line the war techniques have brought about. Victory Techniques helped to win the war . . . now they are going to win the peace.

Your Lindberg Furnace representative is eager to do his share to help you with any metallurgical problem.

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SUPER-CYCLONE for hardening, normalizing, annealing, tempering
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The Aluminum Alloy made especially for this exacting purpose. All standard and any special alloys are available.

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SWIVEL YOKE MOUNTINGS

Hand Cut High Speed Steel Rotary Files and Ground Cutters

N. A. STRAND & COMPANY

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(*Continued from page* 212)

the two 7500-kilovolt-ampere transformers. The 34,500-volt primary lines have an inter-lock for use in case of an interruption on either line. This master transformer station feeds two units of 4160-volt, metal clad switchgear located in the boiler house. The 125-volt direct-current control for the 4160-volt switchgear is provided by a 60-cell battery and generator set located in the cable vault below the switchgear. From the 4160-volt switchgear, cables fan out to the ten substations through a radial feeder distribution system.

Substations consist of switchboards containing manually operated air circuit breakers for control of 480-volt, 3-phase, 3-wire, 60-cycle power circuits and 120/208 volt, 3-phase, 4-wire, solid neutral light circuits and 250-volt direct-current circuits. The direct current, which is for operating cranes, is converted from alternating by rectifiers.

General lighting in the offices in the administration building consists of individual, 4-tube, fluorescent lighting fixtures mounted against the ceiling; other lighting in this building is incandescent. In the personnel building, 3-tube fluorescent fixtures mounted against the ceiling provide ample illumination.

Plant Well Lighted

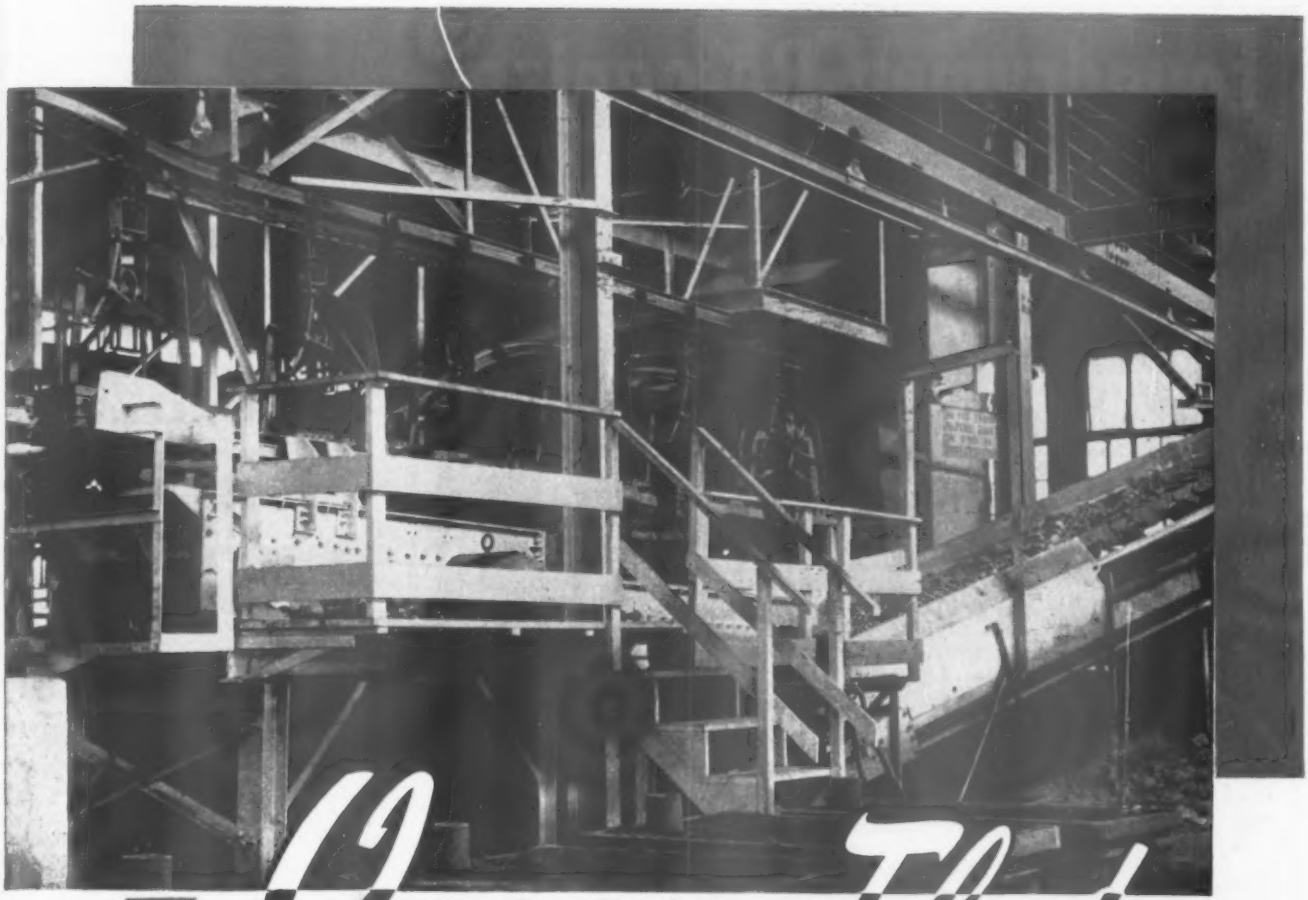
In the main plant, high-intensity mercury and incandescent lighting fixtures are mounted on messenger cable just below the bottom chord of the trusses. In the acetylene generator house and oil storage house, Explosion-proof incandescent lighting is provided. The commissary building, pump house, scale houses and guard towers all are equipped with incandescent lighting. The entire plant is surrounded by a protective lighting system covering the fence and yards by means of fence lights and floor lights mounted on the buildings. Other electrical installations include auto-call, fire alarm, watchman's circuit, sprinkler and clock system throughout.

Water for drinking and for showers is taken from the city system; that for cooling and for fire protection comes from the canal on the bank of which the plant is located. All storm water empties into the canal. Sanitary sewers are run through a treatment plant and connect with the city sewers. Because the pressure in the city mains varies, water taken from them is boosted to 65 pound pressure.

Large quantities of water are used for cooling and quenching, and provision has been made to insure an adequate supply for every purpose. To cool the open-hearth furnace doors, for example, mill water is used, but the system is equipped with a pressure control governor and is connected with the city water system, so that if the pressure of the mill water system declines to a certain point, the city water automatically is turned on and discharges through an open connection into the door system.

Most furnaces other than those in

(*Concluded on page* 216)



Over 1,625 Flasks EVERY HOUR!

The installation above, consists of two 3' x 8', Model "B" Simplicity Shake-Outs. It is probably the most automatic, high speed shake-out in operation in the world today! The upper unit is equipped with a horse, or bolster over which all the flasks must pass while suspended by the arm clamps on the conveyor overhead. This upper unit shakes out over 1625 flasks per hour, while the lower unit knocks out 95% of the core sand from all fittings or castings. Over 1200 units are giving maximum service daily in over 550 foundries and handle a variety of work from a great number of flasks per hour, to 95 ton loads which are shaken out in two to three minutes. Speedier shake-out with maximum flask savings and the reduction of manpower required amortize the equipment cost in less than a year. Every Simplicity unit can be used portably until permanent nstallation is desirable. Have a Simplicity Engineer check your requirements.

Simplicity

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the better job done by

SHELTON METALLIC FILLER

When casting blemishes need filling, use the cement that *sets faster and harder.* In hundreds of foundries SHELTON FILLER is used with complete satisfaction and the list is growing.

Try Shelton Filler - You Will Always Use It

WRITE FOR FREE SAMPLE

PRODUCT OF THE

AMERICAN CRUCIBLE COMPANY

...Shelton, Conn.

(*Concluded from page* 214)

the open-hearth department are gas-fired, and the gas is so metered that each department can figure its costs individually.

The plant was designed by Albert Kahn Associated Architects & Engineers Inc., Detroit, and Thorgerson & Erickson were the general contractors.

Editor's Note: For general description of foundry practice at the Cast Armor Plant, see THE FOUNDRY for July, 1943.

Conducts Course of Foundry Lectures

A course of 24 lectures on the fundamentals of foundry engineering is being conducted at Stevens Institute of Technology, Hoboken, N. J., by the Stevens War Industries Training School in cooperation with the Metropolitan Chapter, American Foundrymen's Association. Tuition is free.

Five lectures were given in October. Remainder of the schedule for the series follows:

Nov. 2 and Nov. 3, "Gating and Risering," H. F. Taylor, chief metallurgist, Naval Research Laboratory, Anacostia Station, Washington, D. C.; Nov. 9, "Molding Methods for Sound Castings," F. G. Sefing, metallurgist, International Nickel Co. Inc., New York; Nov. 10 and Nov. 16, "Sand Testing and Sand Binders," G. Watson, assistant chemist, American Brake Shoe Co., Mahwah, N. J.; Nov. 17, "Effect of Sand and Facings on Castings," W. R. Scott, chief technician, foundry division, Wright Aeronautical Corp., Paterson, N. J.; and Nov. 23 and Nov. 24, "Permanent Mold and Die Castings," A. Sugar, U. S. Metals Refining Co., Carteret, N. J.

Dec. 1, "Melting and Pouring Cast Iron," J. A. Bukowski, plant metallurgist, Worthington Pump & Machinery Corp., Harrison, N. J.; Dec. 7, "Melting and Pouring Steel," C. H. Cline, works manager, the Cooper Alloy Foundry Co., Hillside, N. J.; Dec. 8, "Melting and Pouring Bronze," H. L. Smith, chief metallurgist, Federated Metals Division, American Smelting & Refining Co., Pittsburgh; Dec. 14, "Melting and Pouring Aluminum and Magnesium," A. MacIntosh, assistant foundry superintendent, Wright Aeronautical Corp., Paterson, N. J.; Dec. 15, "Cleaning of Castings," Fred Mosley, engineer, Whitehead Bros. Co., New York; Dec. 21, "Alloying and Heat Treatment, Ferrous Alloys," J. S. Vanick, metallurgist, International Nickel Co. Inc., New York; and "Nonferrous Alloys," R. E. Ward; Dec. 22, "X-ray, Gamma-ray, Magnaflux and Zyglo Inspection Methods," A. Gobis, chief metallurgist, Sam Tour Co., New York; Dec. 28, "Foundry Costs," John L. Carter, cost consultant, Gray Iron Founders Society Inc., Newark, N. J.; and Dec. 29, "Foundry Control," F. G. Sefing.

Jan. 4 and Jan. 5, "Engineering Economics in the Foundry," George W. Barnwell, professor of production practice, Stevens Institute of Technology.

American Standards Group Honored

The American Standards Association received the Army Ordnance Department Distinguished Service Award at a luncheon in New York, Sept. 14. The presentation was made before representatives of the federation of 80 national trade, technical and governmental groups that make up the membership of the A.S.A.

NO heavyweight is needed to lift these 10 tons—just an average 160 lb. man can do it easily and quickly with a Reading Multiple Gear Hoist. Spur gears, running in a bath of oil, are contained in a dust-proof and oil-tight housing making it one of the easiest hoists to operate. And long life and great efficiency are insured whether it is used indoors or out.

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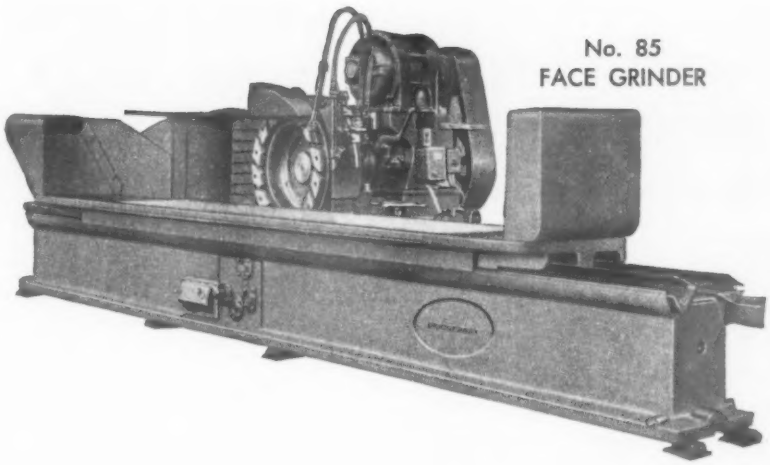
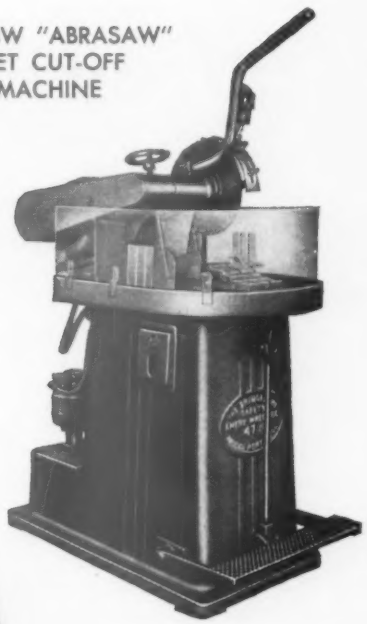
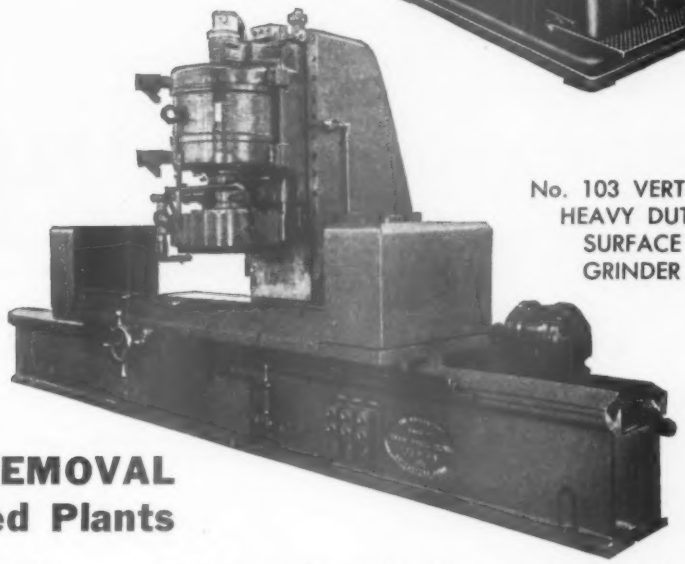


No. 85
FACE GRINDER

No. 48W "ABRASAW"
WET CUT-OFF
MACHINE



No. 161 HIGH SPEED
MOTOR DRIVEN
FLOOR GRINDER



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Long-lived, smooth-running bearings, efficient cooling, extreme ruggedness and rigidity of frame and fittings, convenient location of controls and adjustments—these are a few of the advantages which have placed "Bridgeport" equipment in high production industries throughout the U. S. and foreign countries.

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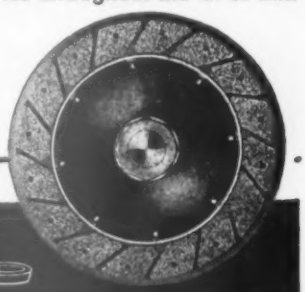

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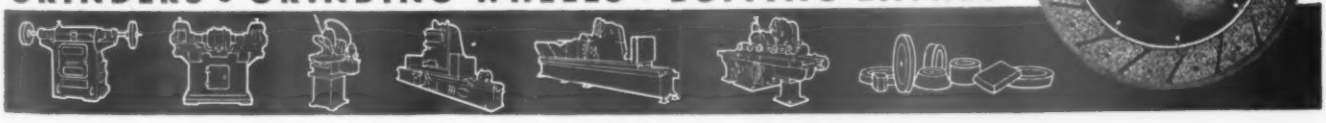

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SOUTH AMERICA
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Birmingham 3, Ala.

WESTERN NEW YORK
G. W. Brunton & Son
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PITTSBURGH
Rees Machinery Co.
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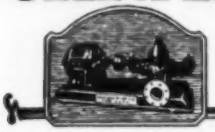
If you are interested in heavy volume in the immediate Post-War era, we would like to hear from you.

If you can supply urgently needed castings now for War Production, write us at once, giving us data on your capacity immediately available and the general class of work you handle. We will send a representative to your foundry with complete details of our requirements.

We need 3% Nickel Alloy Iron Castings ranging in weight from 20 to 1000 pounds, all made in cores.

CHICAGO PUMP COMPANY



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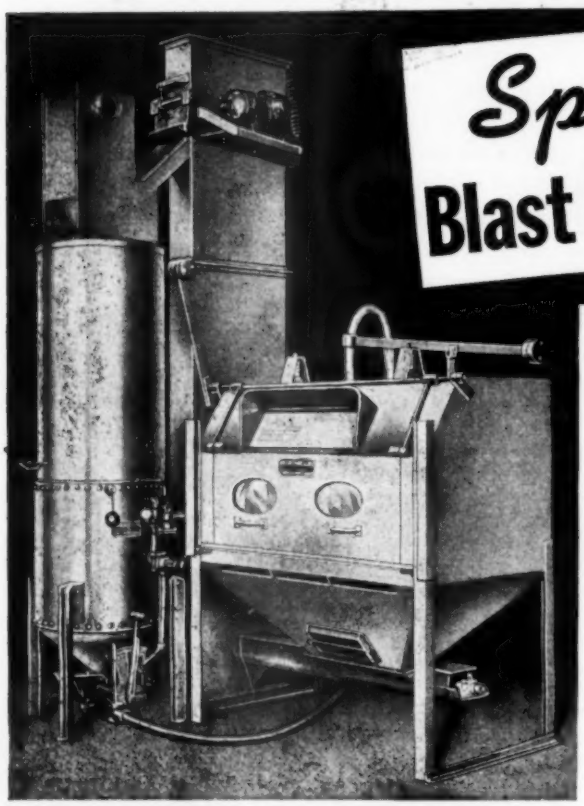

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RUEMELIN *Blast Cabinets*

A 4397-⅛

CHILLED IRON PRODUCED BY TELLURIUM

(*Continued from Page* 89)

depend upon the concentration of the tellurium on the mold surface.

One of the advantages of the mold application is that it permits the production of hard, wear-resistant surfaces at any localized area on the casting. This may be done by treating a metal insert with the tellurium wash and anchoring it in the mold to extend into the mold cavity at the point where the chilled surface is desired. The hot metal will melt the insert, but the residual tellurium will cause a white iron structure to form at that point. A localized chill also can be obtained by coating specific areas of the mold surface with tellurium-bearing washes.

In making tellurium additions, adequate ventilation should be provided. Otherwise, there may be toxic effects, and garlic breath has been known to result.

Lorig and Krause, in adding tellurium to a gray iron containing 2.65 per cent carbon, 2.00 per cent silicon, 0.4 per cent manganese, 0.15 per cent phosphorus, and 0.036 per cent sulphur, report an all-white structure of the metal in sections up to 1 inch on tellurium additions of both 0.025 and 0.05 per cent. Without any addition the structure was all gray.

Resist Acid Attack

When tellurium was applied as a mold wash with the tellurium content varying from .01 gram to .05 gram per square inch, the chill depth varied from 1/16-inch to 3/16-inch with an iron containing 3.20 per cent carbon, 1.70 per cent silicon, 0.50 per cent chromium, 0.20 per cent phosphorus, 0.50 per cent manganese, and 0.07 per cent sulphur.

In a test for resistance to acid attack, these investigators reported the following losses in grams after 26-hours' exposure for an untreated, unchilled gray iron and for a tellurium-treated gray iron:

	2% H_2SO_4	2% HCl
Untreated, unchilled	4.16	5.51
Tellurium treated	3.08	2.29

Smalley claims that the addition of tellurium increases the depth and the hardness produced by a metal chill as compared to the depth and hardness secured in the absence of tellurium. As an example, he cites an iron containing 3.1 per cent carbon, 1.2 per cent silicon, 0.7 per cent manganese, 0.095 per cent sulphur, and 0.2 per cent phosphorus. Without any tellurium, this iron when cast against a metal chill had a chill depth of ⅜-inch and a brinell hardness of 415. The addition of 0.0025 per cent tellurium increased the chill depth to 1½ inches and the brinell hardness to

(*Concluded on Page* 220)

LIGHTNING SPEED
DoALL *Zephyr*
CUTS NON-FERROUS METALS FASTER!

Quicker, smoother cutting of Aluminum, Magnesium and other new war materials had aircraft engineers and production men stymied until the DoALL Zephyr came along.

Just a few Zephyr Cutting Records:

Aluminum	**90 sq. in. per min.**
Magnesium	**120 sq. in. per min.**
Magnesium Alloy	**192 sq. in. per min.**
Yellow Brass	**36 sq. in. per min.**
Hygrade Zinc	**90 sq. in. per min.**

Handles plastics, laminates and wood with speed and accuracy never before thought possible. Ruggedly made to operate with minimum vibration at speeds up to 10,000 f.p.m. Equipped with Variable Speed Control and a Job Selector, a sure guide in choosing proper speed and saw for each job.

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METAL MAKING

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(*Concluded from page* 218)

460. When 0.005 per cent tellurium was added, the specimen chilled through and the hardness increased to 469. With 0.10 per cent tellurium, a brinell hardness of 477 was secured.

Smalley further says that the addition of an agent from the class consisting of copper, nickel, and molybdenum when added with tellurium produces a hardness and a toughness unobtainable with tellurium alone. He states that when 2.5 per cent of copper was added with tellurium, a cast iron had a hardness of 470 compared to 430 obtained with tellurium and no copper. When the tellurium was used with 4.0 per cent nickel, the brinell hardness increased from 430 to 530.

The cost of using tellurium as an addition to cast iron is negligible. In few applications it is necessary to use more than 2 to 3 ounces of tellurium per ton of iron. With tellurium at $1.75 per pound, the cost is on the order of 20 to 30 cents per ton of iron. In no other way is it possible to secure similar results at comparable costs.

The potential uses of tellurium in cast iron are many and varied. Practically any wear-resistant surface required on a gray iron casting can be produced with its use. This means that it is applicable to virtually all types of machinery, equipment, and apparatus which employ castings in parts subjected to wear.

Addition of tellurium to cast iron by direct methods or by the use of tellurium-containing mold washes is covered by United States patents previously referred to, and detailed information concerning licenses to use it is available from the Battelle Development Corp., Columbus, O.

References

1. U. S. Patents 2,250,488 and 2,250,489.
2. U. S. Patents 2,281,460.

Excavation Unearths Old Casting

During excavation work on the outskirts of Smolensk, Russia, a cast iron slab was unearthed bearing the imprint of the hand of Peter I, according to *Information Bulletin* of the U.S.S.R. Washington embassy. The reverse of the slab bore the inscription: "Taken from an impression of the hand of Peter I, made by him on sand in the foundry he created in 1707 in the city of Lipetsk."

Opens West Coast Office

H. K. Porter Co. Inc., Pittsburgh, and subsidiaries has opened offices at 849 Petroleum building, Los Angeles 15, Calif. Plans are also in the making for San Francisco offices. Harold A. Hintz has been appointed district manager for the new territory. Mr. Hintz formerly was associated with Axelson Mfg. Co., Los Angeles, as field sales engineer.

LESS FUMES and MORE METAL

Courtesy George Adler Foundry, Cleveland, Ohio

Non-ferrous melting losses depend primarily on three factors:

1. **Composition of Alloy**
2. **Shop practice**
3. **Melting Equipment**

Losses may be practically zero when melting copper but will naturally be higher when melting high zinc alloys.

Experienced melters under good management can hold metal losses to a minimum with Crucible furnaces.

In Crucibles the metal is protected from direct contact with the source of heat, thus producing high quality metal with minimum volatilization and oxidation.

Independent engineering surveys show that Crucible non-ferrous melting loss is as low, or lower, than any other method.

Crucible furnaces, at a fraction of the first cost, operate with the lowest measured metal loss..

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CD—Direct connected to electric motor. For ducts, hoods, roof ventilators and for mounting in walls, windows.

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CBS—A heavy-duty belt-driven design for ducts or stacks to handle explosive vapors, dust, or high temperatures.

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☐ Heat ☐ Fumes ☐ Moisture ☐ Dust

PROPELLAIR

COKE PROPERTIES AND CUPOLA MELTING

(*Continued from page* 97)

entry into the bed.

Another coincident effect of smaller coke is the decrease in permeability of the bed. In the instance of smaller coke the bed density increases and under the same pressure conditions the proper distribution of gases becomes difficult, causing local increases of flow particularly around the periphery. This situation is aggravated materially when the coke contains a wide range of particle sizes which fill the voids between the larger pieces.

Conditions enumerated previously are fundamental and influence the thermal or metallurgical conditions regardless of the process burning the coke. In the writer's opinion an atmosphere of either high CO or CO_2 can be created with a good sound coke, properly sized, by regulating the quantity of air used when the other influential factors are balanced.

In the selection of a coke size for an individual operation, the diameter of the cupola should not be the only determining factor. There is a general relationship, it is true, but normally this applies only in the range of average gray iron composition.

Permit Studies To Be Made

Introduction and use of sized coke has permitted studies to be made under full scale operation which could not be done a few years ago. Results accomplished under these conditions in several instances are far different from those obtained on small scale test procedures. These differences will be pointed out later.

Reference to different sizes will include only those already mentioned. We have used smaller cokes (down to 2½ inches) for special cases, but these were isolated and our experience will only be reported on the sizes regularly used.

Larger coke (plus 4 inches or plus 5 inches) is conducive generally to the fastest melting rates and greater ease in obtaining maximum temperatures. This is due to its greater permeability permitting the air and the gases to penetrate the bed to a greater distance. This in turn causes melting to occur over a larger area of the bed. In certain instances, however, when sufficient penetration of the bed is not effected, large coke can cause excessive oxidation because of the narrow path of travel of the gases over a limited carbon surface.

Effect of less carbon surface exposure is reflected further in the necessity for deeper initial and operating beds. Oxygen in the air travels higher above the tuyeres before it is consumed, which results in a broad, deep zone of maximum temperature. Contrary to MacKenzie's[8] data, our experience has been that high carbons are obtained with large coke, due to the broader, deeper zone which can be obtained with use of this coke.

The smaller coke (3 x 4 inches) offers some interesting contrasts to that reported for the large coke. Maximum temperatures (2800 degrees Fahr. plus) are more difficult to attain as also are maximum melting rates, particularly in the larger cupolas. Lower carbons invariably result, lower operating beds are required and appreciable reductions in silicon and manganese losses occur. Higher wind box pressures generally obtain, but the greater carbon surface exposure counteracts this influence on oxidation as the lower silicon and manganese losses indicate. The melting zone as reflected by the lining burn-out is much narrower and closer to the tuyeres. This all coincides with the previous references.

The intermediate size of coke (3 x 5½ inches) gives, as is to be expected, intermediate results and operates very favorably with medium sized cupolas. Where lower carbons are desired in the medium range this size accomplishes that purpose.

It should not be thought, however, that a change in coke size can be made without having to make some adjustments to operating procedure, for it is seldom that conditions are so balanced to permit the substitution with no change. The smaller coke requires much more careful balancing of conditions than does the larger coke, particularly to obtain the desired melting rates and temperatures, and this is especially true with respect to coke quantities and air rates. Generally the changes are made gradually to observe the trend of performance on the particular installation.

Coke Performs Satisfactorily

The 3 x 4 inch coke at the present time is performing very satisfactorily on cupolas ranging in diameter from 32 to 72 inches. In the smaller sized cupolas the operation may be on average gray iron as well as high strength iron, but in the larger cupolas this is not the case, for in these instances this coke size has been applied to accomplish some particular problem of control.

In the comparisons cited the coke has been the same in every respect, that is volatile matter, fixed carbon, ash, sulphur, etc., except size, and also no alterations of any of the cupolas were necessary to accommodate the different sizes.

We mentioned before that the well was not the zone of maximum carbon solubility. This has been clearly demonstrated by the results obtained with large and small coke in the same cupola. Here, if surface exposures were the criterion of carbon absorption, the small coke in the well would have raised the carbon, but such was not the case. There is some solubility of carbon in the well, for the cupola with a front slagging spout (low well) and continuous pouring will lower the carbon some 5 to 10 points because of less contact with the carbon under these conditions. We have been able to effect reductions of as much as 30 points by the use of the smaller coke with no change in cupola dimensions and after balancing operations.

(*Continued on page* 224)

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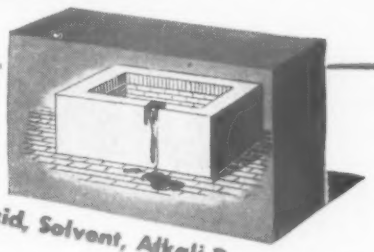

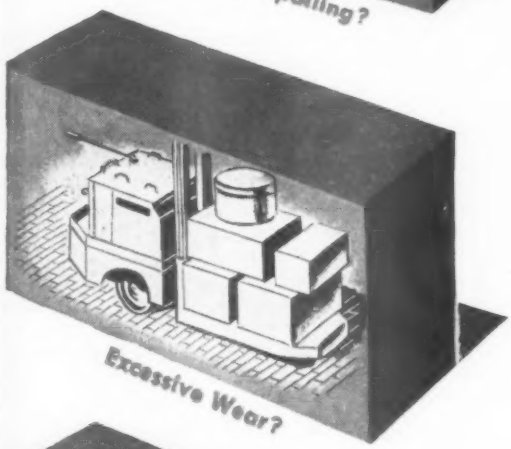

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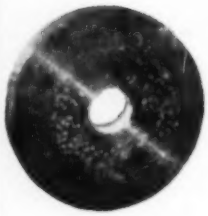

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(*Continued from page* 222)

Among the many operations we have observed with these different sizes we have encountered a wide range of well depths, tuyere ratios, stack heights, melting rates, temperatures, bed depths, coke ratios, and pressures, and we firmly believe that carbon solubility or control is a function more of bed conditions than of any other single factor, for the objectives listed earlier were always part of the imposed conditions during the adjustment of the operation.

In determining the proper bed height to use, several factors must be kept in mind. In most instances the initial bed is too high, probably as a safeguard against having one too low. The writer believes, however, that there are several advantages to starting with a bed as close to its operating height as possible: (1.) The start will be quicker, (2.) maximum temperatures will be reached the more quickly, (3.) carbons will be lower (if this is a factor), and (4.) some coke will be saved. To accomplish this the bed should be thoroughly burned, using the blower, if necessary, and using only 5 to 6 inches of coke for the final dressing. The final height should be measured and recorded. The factors which determine the bed height are as follows:

1. *Melting Rate.* On the same cupola a faster than normal melting rate will require a higher bed.

2. *Coke Size.* The smaller the coke size used the lower will be the required bed.

3. *Operating Pressure.* With high operating pressures the bed will have to be higher than normal, all other factors remaining the same.

4. *Carbon Desired.* When high carbons are desired and they are accomplished by direct solubility a high bed is necessary both initially and during the heat. This latter, of course, requires a higher than normal coke per charge. Conversely low carbons require a minimum bed and minimum coke per charge.

5. *Size of Cupola.* This generally has less effect than the factors previously mentioned. Large cupolas, with poor penetration of the bed will require somewhat higher beds.

No general formula is offered to determine bed height, because it is felt that each particular operation suggests and requires its own optimum operating height.

Determining the quantity of coke per charge really poses a dilemma, not so much that the ratios are difficult to calculate, but because the conditions imposed often demand more coke than would be required if the cupola and its operation were properly adjusted. The previous sections should clearly reveal why this is so.

At the outset it should be stated that the ratio most generally quoted, namely 10 to 1, is the one most seldom actually encountered. This is understandable, for except in very rare instances will this quantity of coke suffice for the temperatures, and melting rates now universally demanded. Further affecting this factor is that pig iron quantities are lower and scrap quantities are higher than in former years, both requiring more coke. Lastly, as the steel quantity increases, more coke is required because of the quantity of carbon absorbed.

When conditions permit, that is with good material size and other factors in proper balance, an average gray iron mix will require about 250 pounds of coke for 2000 pounds of iron. This quantity will permit a fairly fast melting rate, commensurate with the cupola diameter and generally will produce melting temperatures of 2800 degrees Fahr. plus. When steel is used in the mix an additional 3 pounds of coke per 100 pounds of steel is required.

Faster melting rates than normal generally will require an increase in the quantity of coke per charge, and conversely slower melting rates will permit a reduction in the quantity of coke used. Sized coke generally permits a better balance to be made between the coke and the iron with no sacrifice in temperatures, melting rates or iron composition, and when the other factors are adjusted closer control is possible.

Subject to Breakage

In concluding this section on coke size we should mention that the larger cokes are subject to more breakage in handling than the smaller cokes because of the prevalence of more fissures. In most instances, however, and unless the breakage is extreme, and smaller sizes fill the voids appreciably, this factor does not seriously interfere with operations. Generally the larger size is employed on operations not requiring the extremely close tolerances that high strength iron demands. The materials too, are usually larger and fairly open stock texture is maintained. Extreme breakage of the large coke will cause slower melting rates and drop in temperatures and oftentimes a higher coke ratio is a necessary corrective. This breakage, of course, is undesirable and every producer strives to eliminate it to the best of his ability.

The points discussed in this section refer, of course, to cokes regularly sized and within the size range note. Attention was directed earlier to the effect on combustion when the coke contained a wide range of sizes and this distinction must be kept in mind.

There are certain features of coke which are the direct result of the manufacturing process and the equipment used to carbonize the coal from which it is made. It is highly important that these features be recognized and understood so that proper evaluation of the coke from the standpoint of its use in cupola operation can be made.

Coal itself is a highly complex organic substance, and the selection of particular grades for foundry coke necessarily is very involved. Not only must the moisture, sulphur and ash contents be carefully limited, but also the coking characteristics themselves must fall within narrow boundaries. Carbonizing conditions must, at all times, be regulated carefully and require a stringency of control

(*Concluded on page* 226)

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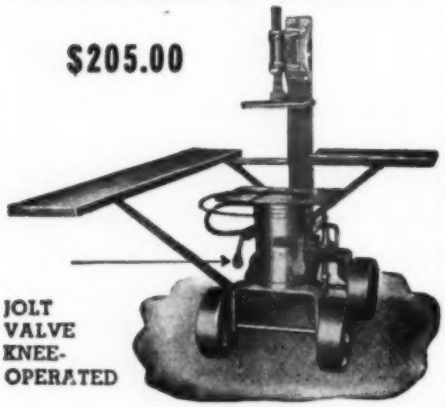

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(*Concluded from page* 224)

not encountered for other grades of coke.

Coal as mined is not in the state of preparation for immediate charging to the ovens. This is true for two reasons: (1) Its size, generally, is not sufficiently small or uniform enough, so it is crushed and pulverized at the coke plant; (2) few coals by themselves produce cokes of sufficient strength and character to meet present day requirements. Blending of two, three or four different coals now is practiced quite universally to obtain the desired structure.

Each coal and coal mix has individual coking characteristics so that the proper coking time must be selected and maintained to produce the desired physical and chemical structure of the coke. Temperatures are so adjusted, after this feature has been determined, that the ovens push on a predetermined time and in series, which schedule is carefully adhered to to minimize structural change in the coke.

In this discussion we are concerned with by-product foundry coke where the coal is charged directly into the hot ovens which are long chambers roughly 40 feet long, 10½ feet high, and 17¼ inches wide (some variations from these dimensions occur in different plants), holding approximately 12½ tons of coal. Carbonization begins immediately, commensurate with existing wall temperatures. The progressive changes of the coal are as follows: (1) Moisture is driven off; (2) the coal softens and fuses; (3) gas is released causing frothing; (4) the mass hardens leaving the porous or cellular structure associated with coke.

Separates in Center

With the ovens heated from both sides the heating planes advance toward the center of the oven. Fig. 12 is a front view of an oven being pushed. The division of the oven into two distinct separate halves is evident, as well as the horizontal fissure lines from top to bottom. When the planes meet a distinct rupture occurs separating the two halves. It can readily be seen then that the width of the oven employed fixes the largest dimension in one direction that a piece of coke can have.

Another phenomenon is that all coals develop fissures in the direction of heat flow and cross fractures paralleling the wall. The degree of fissuring and fracturing is a function of the coals and the carbonizing rate. This is illustrated in Fig. 9. This is a side view of an oven being pushed and shows the cauliflower development next to the oven walls and the natural fissure lines which determine the size of the piece in the second and third dimensions.

Fig. 8 shows two full length pieces of coke (half of the oven width) illustrating degradation resulting from excessive temperature of carbonization. The piece on the left shows an exaggerated fissure development more than half way through the piece. This coke will break up very badly in handling. The piece on the right shows a normal, sound development and will handle well without excessive breakage. Here again can be seen the influence of the process upon the size and physical characteristics of the coke.

The run-of-oven size of the coke is shown in Fig. 10. A certain amount of natural breakage occurs which must be screened out in order that when received for cupola use it will be regularly sized and contain a minimum of fines. The breakage of the coke which occurs between the point of production and when it is charged into the cupola, is a direct result of the natural fissure development and the amount of handling received.

In addition to the native sizes of the coke as produced, present day requirements demand narrow limits between top and bottom sizes. This is accomplished by means of rotary grizzly screens and the conventional square mesh steel cloth shaker screen. Fig. 11 illustrates the grizzly screen.

Following the screening process the coke is loaded over booms into the car. Some of the coke may be undercarbonized forming what is generally known as "green" butts. These are soft, spongy, undercarbonized pieces, resulting from insufficient carbonizing temperature and because of their scattered occurrence they must be hand picked out of the coke stream. These pieces are undesirable because they burn very rapidly and when occurring in appreciable quantities can cause extreme difficulty. The rapid combustion of this type of coke at normal air rates can cause loss of bed height, with the usual attendant ills of oxidized iron, low temperatures and slow melting rates. A higher coke per charge will improve conditions somewhat, but the obvious correction is, of course, a minimum content of coke of this character.

Features Exert Influence

No attempt has been made in this discussion to cover the whole field of coke characteristics, for to do so would require a very extensive treatise. We have however, selected certain isolated features, which in actual cupola practice, have been found to exert definite and controllable influences and these we have correlated with the process.

Because so many of the features of the process are associated with the combustion conditions, and when difficulty occurs coke, being the fuel, invariably is held responsible, we have tried to point out the distinguishing difference in each instance. That these factors overlap, there is no question, but the correct assignment of cause is vital to the interests of both the foundryman and the coke producer and we hope that the previous discussion will help to explain to a certain extent, at least, some of the apparent contradictions of the process.

References

5. Mulcahy, B. P.—"Foundry Coke: Measureable Characteristics." American Gas Association, Production Conference, 1940; "Foundry Coke Specifications." *American Foundryman*, September, 1940.

6. MacKenzie, J. T.—"Cast Iron as Affected By Coke Size in Cupola Melting."—*Transactions* A. F. A. 1937, p. 293-319.

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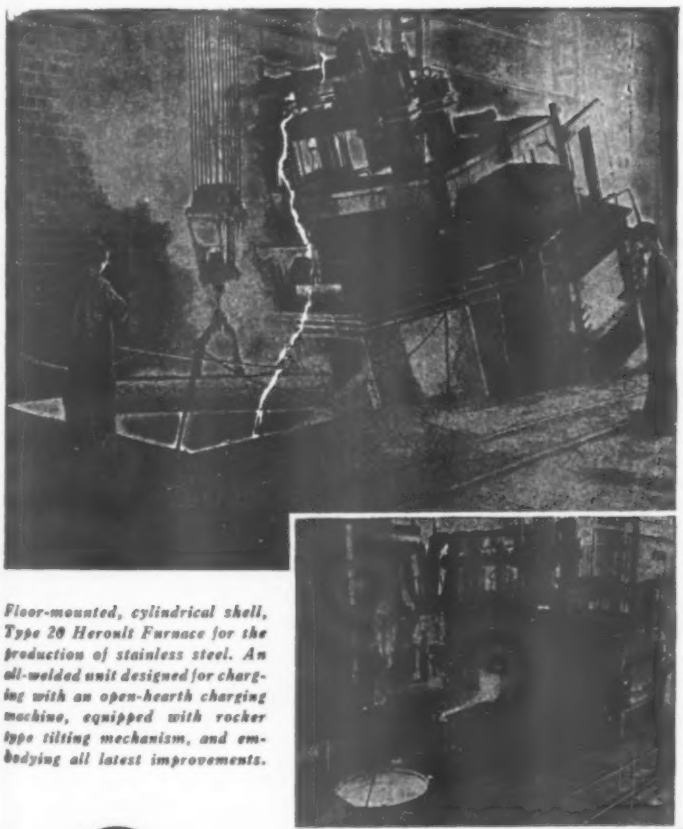

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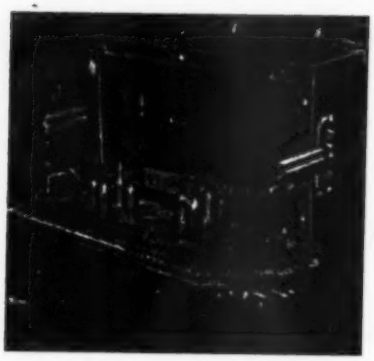

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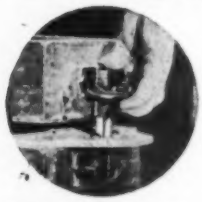

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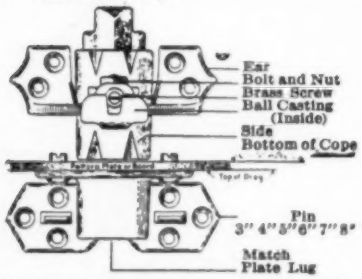

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FLAT SPRAY NOZZLES—A new 8-page bulletin, No. 459, published by Chain Belt Co., Milwaukee, describes its flat spray nozzles for service in practically all industries where water is used in cleaning, cooling and washing operations. The folder gives tabular information concerning discharge in gallons per minute, dimensions, list of materials, sizes and prices.

HEAT TREATING OVENS — An attractive, illustrated 12-page pamphlet offered by Young Brothers Co., Detroit 7, describes typical examples of standard and special heat treating ovens designed and constructed to meet individual plant and production requirements.

FLOORING—A new 6-page bulletin released by Walter Maguire Co. Inc., New York, describes the way to cut flooring maintenance costs and reduce slipping accidents. It gives flooring test curves for load and strength, and presents a simple check-chart for flooring selection.

INDUSTRIAL FURNACES — W. S. Rockwell Co., New York 7, has published two new bulletins. No. 411 describes its crucible melting furnaces, stationary and tilting types, oil or gas fired, for aluminum, brass, copper, silver and other nonferrous metals; and No. 412 describes its oil, gas, and electric rotary carburizing furnaces.

DIAMOND TOOLS—Larco Diamond Tools, 551 Fifth Ave., New York, offers a 22-page catalogue designed to be kept current by supplying additional pages from time to time. Descriptions and prices of dressing, chisel and radius tools, diamond powder, impregnated wheels and cutters, are included.

MARKING DEVICES — A 4-page bulletin issued by Marquette Engraving & Mfg. Co., Chicago 13, describes and illustrates die inserts, roller dies, special type and type holders, a special holder for embossing type, steel stamps, steel letters and figures. Standard stock symbols and symbols available in series, as well as a size chart to aid in selecting correct size symbols, are included.

HIGH-LIFT TRUCK—Lyon-Raymond Corp., Greene, N. Y., has issued a 4-page bulletin, No. 136, describing a tubular steel, electric welded 1000-lb. capacity high-lift truck, designed to handle skid loads with the versatility of a smaller, low-type truck.

SHOT PEENING—American Foundry Equipment Co., Mishawaka, Ind., has published a study titled "Shot Peening and Fatigue of Metals". Types of structural damage of metals, origin of fatigue cracks, effects of cold working, measurement of shot peening intensity and examples of increased fatigue life from shot peening, are covered. The booklet is illustrated by microphotographs, charts and tables, and contains research data never before published.

BURNERS — Bloom Engineering Co., Pittsburgh, has issued Bulletin No. 1220-5 covering the theory, applications and dimensions of tempered-flame burners which feature flexibility of furnace operating temperatures with completely controlled heating conditions. Bulletin No. 1020 describes hot air burners suitable for high temperature applications for natural gas, coke oven gas, oil or tar fuel, or mixed gas and air suitable for soaking pits, billet heating furnaces, and melting furnaces.

MELTING FURNACES—Fisher Furnace Co., Chicago 40, has prepared two new catalogs. No. 550 describes recommended applications, capacities and dimensions of its furnaces for melting nonferrous metals, with information covering centrifugal blowers, blower and oil pump units, oil burners, linings and furnace cement. No. 600 describes a wide range of accessories, including combustion and temperature controls, thermocouples, mixers, gauges, strainers, etc.

CHAPLETS — Catalog 120 recently issued by Smith & Richardson Mfg. Co., Geneva, Ill., presents a complete list of chaplets and related items, hinge tubes, tin forms, perforated tin skimmers and skim gates, and cast iron chills for magnesium and aluminum castings. The catalog is profusely illustrated and contains all the information needed in ordering practically any conceivable shape and size of chaplet for ferrous and nonferrous foundries.

WORM GEAR REDUCERS—Book No. 1824, a complete 100-page data book on worm gear speed reducers for industrial applications is now available for distribution by Link-Belt Co., 307 N. Michigan Ave., Chicago. The book contains dimensioned line drawings, engineering data, horsepower ratings, and tables of weights and dimensions designed to aid in selection of the type and size of reducers required for specific services.

HEAT TREATING BATHS—A. F. Holden Co., New Haven 8, Conn., has published a 4-page bulletin indicating the steps, baths, temperatures, times and equipment used for its flow heat treatment. Technical information as to physical properties obtainable through the process is included.

ELECTRONIC SUPPLIES — Walker-Jimieson Inc., Chicago 12, furnishes monthly, upon request, an industrial availability list showing items available on priority for immediate delivery from stock. The issue lists such items as tubes, test equipment, industrial sound systems, timers, relays, x-ray machines, condensers, electric drills, etc.

SALT BATH HEAT TREATING—Dempsey Industrial Furnace Corp., Springfield, Mass., has issued Bulletin 3-7, analyzing and discussing the advantages of immersed electrode salt bath heat treating.

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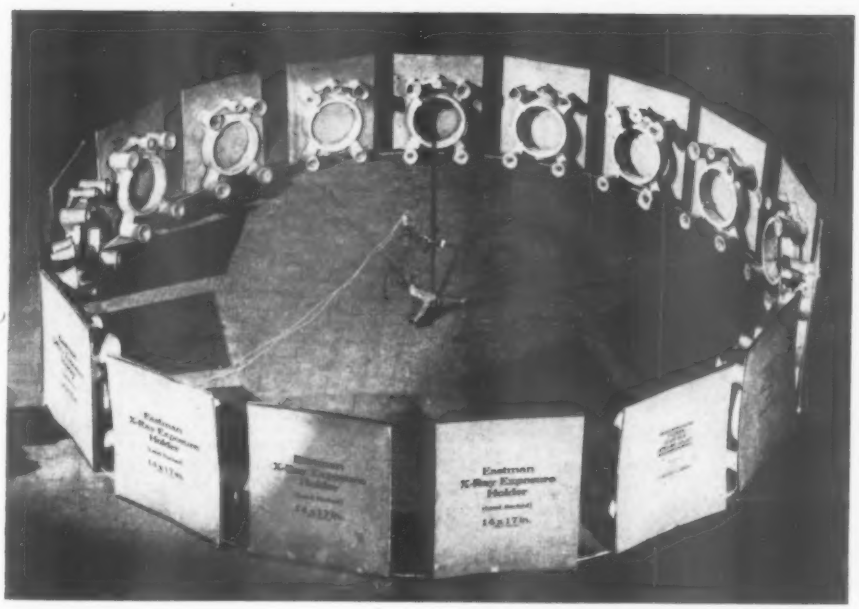

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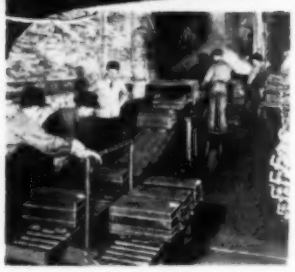

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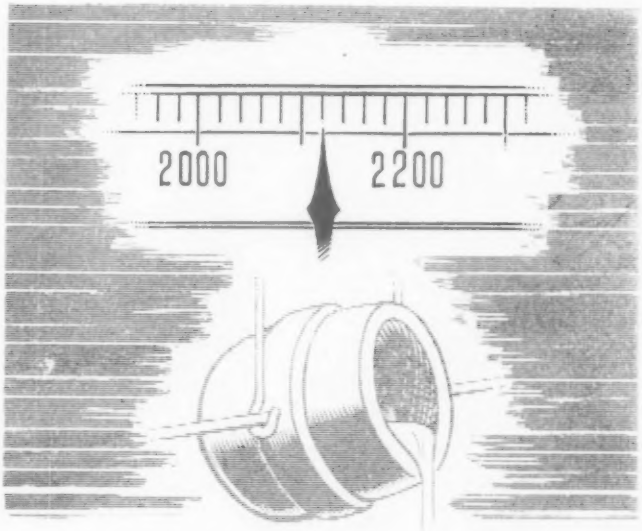

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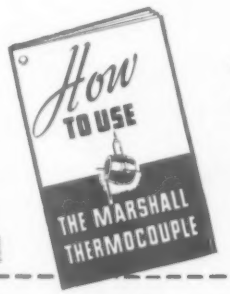

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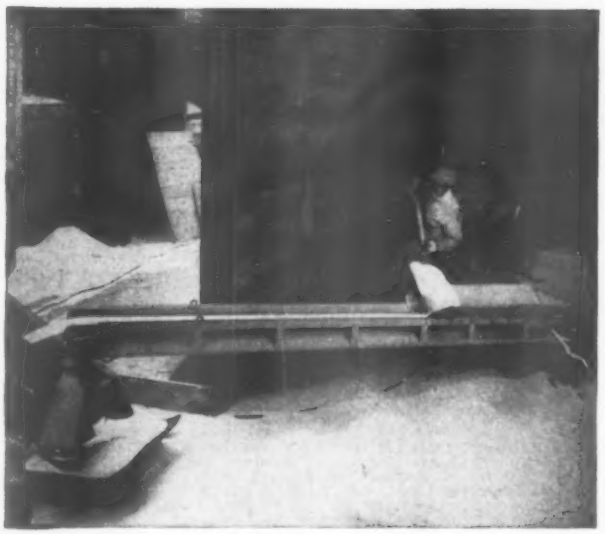

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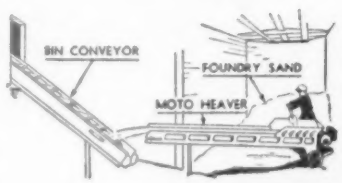

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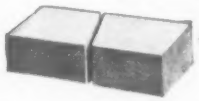

This acid brick, for use in an acid chamber, was cut completely in two in just 29 seconds.

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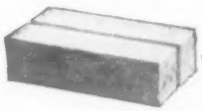

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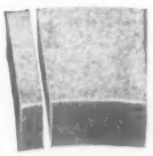

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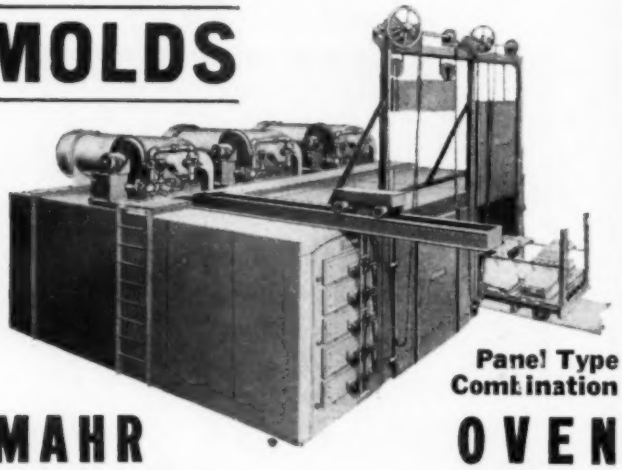

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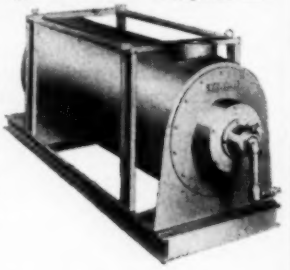

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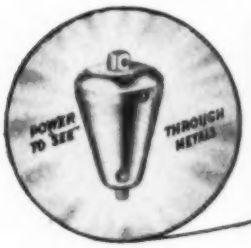

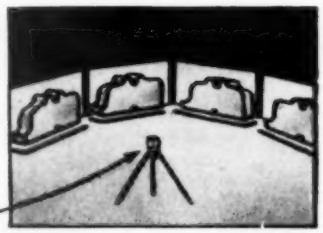

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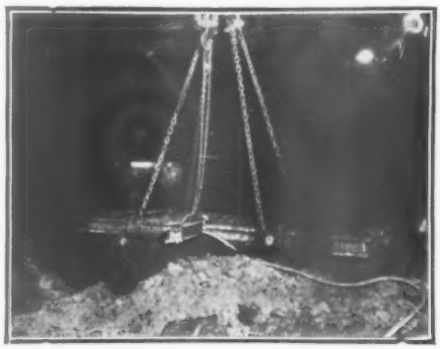

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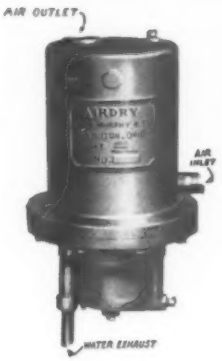

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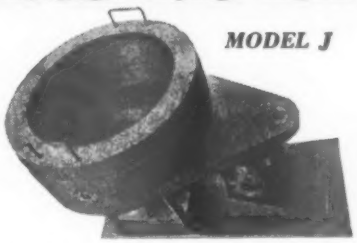

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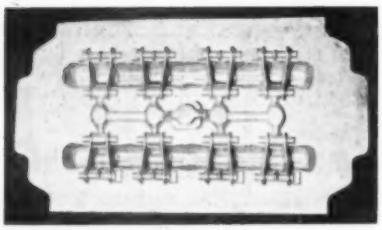

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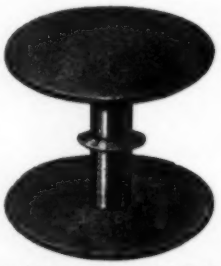

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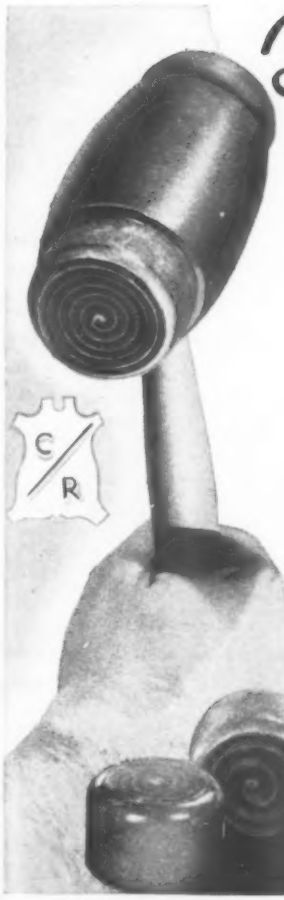

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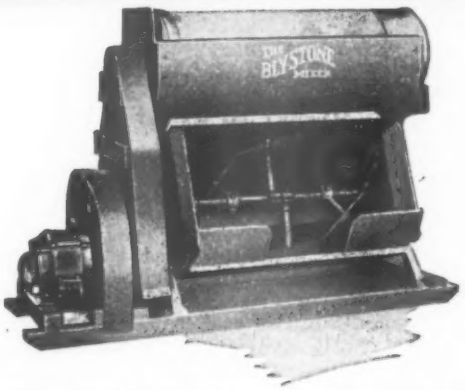

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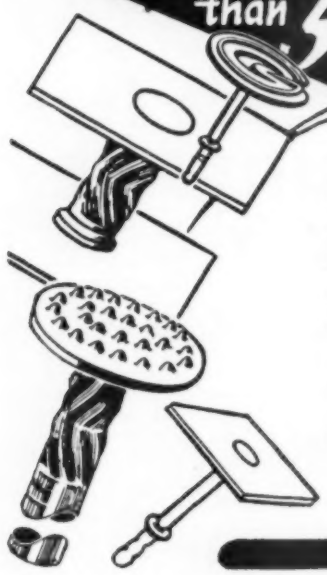

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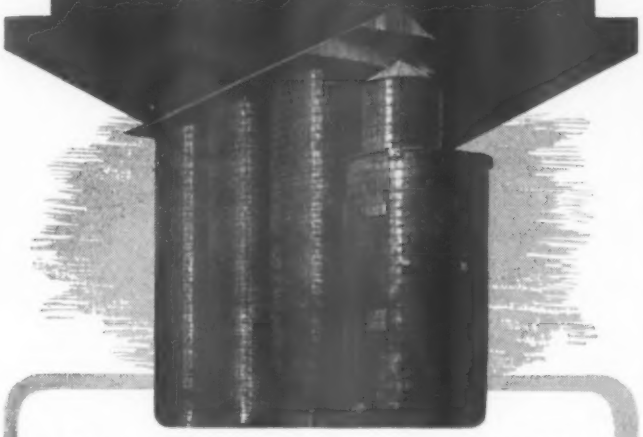

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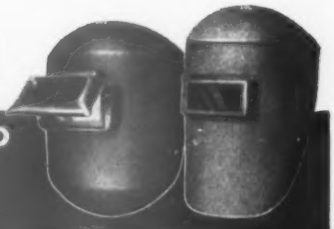

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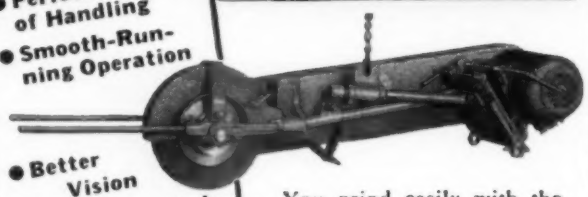

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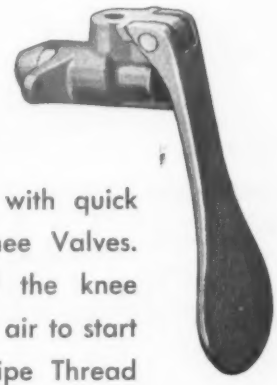

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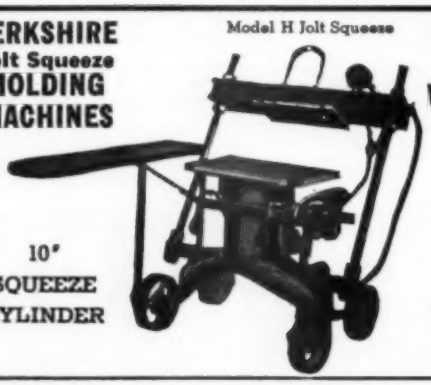

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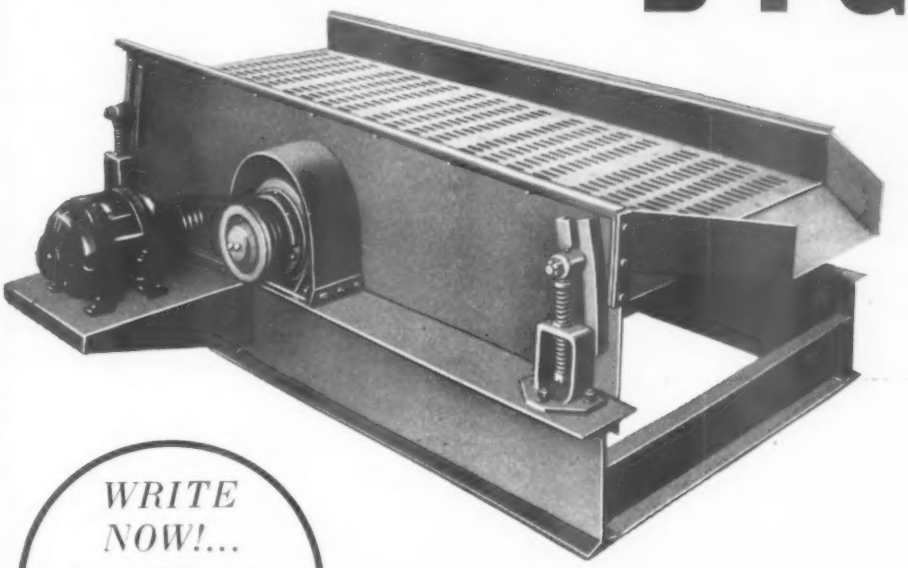

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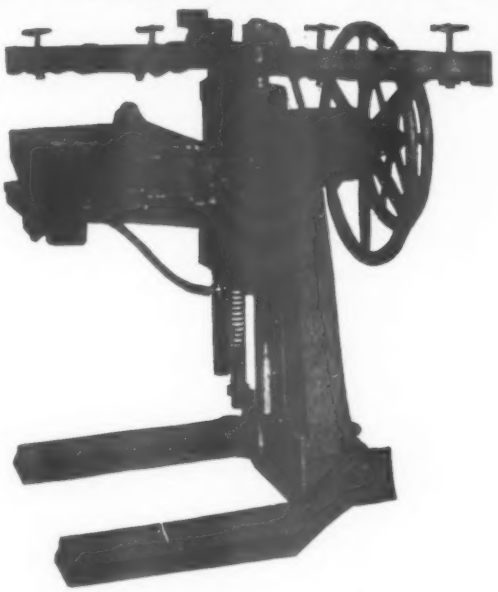

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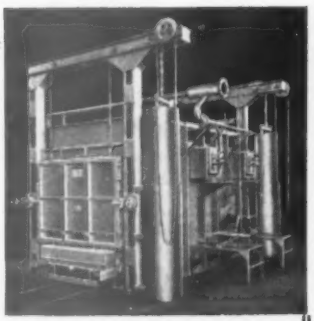

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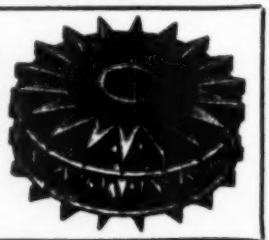

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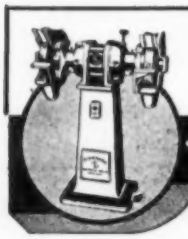

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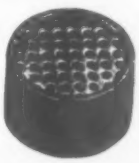

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Experienced in coremaking in foundry. Capable of handling men and setting rates. Excellent postwar opportunity. Reply giving full details, age, experience, salary desired. Replies held confidential.

BOX 569

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Well-known manufacturer of high grade line of plumbago, facings, parting, blacking, core wash and allied foundry items wishes to obtain additional representation by salesmen now calling on foundries regularly. Liberal commission basis. Please advise territory covered, lines now handled, experience with foundry items, etc. Address Box 217, The FOUNDRY, Cleveland.

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Two (2) Salesmen wanted by large eastern jobbing foundry making iron and bronze castings. One salesman who has specialized in bronze castings, and the other who has specialized in alloyed iron castings, including high silicon, chrome and nickel alloys, and is familiar with their applications. Give complete details of past employment, age, salary and availability. Address: Box 583, The FOUNDRY, Cleveland 13, Ohio.

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Or good first helper to operate 1½ ton Moore furnace making low alloy and carbon steel. St. Louis territory. State qualifications and salary. Address: Box 682, The FOUNDRY, Cleveland 13, Ohio.

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Experienced in the production of brass valve castings. Newark, New Jersey foundry producing 40 tons monthly. State qualifications and references. Address: Box 662, The FOUNDRY, Cleveland 13, Ohio.

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STATEMENT OF OWNERSHIP

Statement of the ownership, management, circulation, etc., required by the Act of Congress of Aug. 24, 1912 and March 3, 1933, of THE FOUNDRY, published Monthly at Cleveland, O., for Oct. 1, 1944, State of Ohio, county of Cuyahoga, ss. Before me, a notary public in and for the state and county aforesaid, personally appeared Geo. O. Hays, who, having been duly sworn according to law, deposes and says that he is the Business Manager of THE FOUNDRY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of Aug. 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal laws and regulations, to wit: 1.—That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, The Penton Publishing Co., 1213 West Third St., Cleveland 13, Ohio. Editor, Frank G. Steinebach, 1213 West Third St., Cleveland 13, Ohio. Managing Editor, None. Business Manager, Geo. O. Hays, 1213 West Third St., Cleveland 13, Ohio. 2.—That the owner is the Penton Publishing Company, Cleveland, Ohio. Names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock: Edwin C. Barringer, Washington, D. C.; Samuel E. Bool, Cleveland, Ohio; Richard M. Bourne, Cleveland, Ohio; Dorothy L. Cole, Long Island, N. Y.; County National Bank of Santa Barbara, Santa Barbara, Calif.; J. R. Dawley, Cleveland, Ohio; Ernest C. Dempsey, Richard Inglis & Central National Bank of Cleveland as Trustees under agreement with John A. Penton dated Feb. 16, 1924, Cleveland, Ohio; The Fanner Manufacturing Co., Cleveland, Ohio; George O. Hays, Cleveland, Ohio; Russell C. Jaenke, Cleveland, Ohio; S. H. Jasper, Pittsburgh, Pa.; A. L. Klingeman, Cleveland, Ohio; E. C. Kreutzberg, Washington, D. C.; Parness & Co., Cleveland, Ohio; J. D. Pease, Mount Dora, Florida; L. E. Penton, Los Angeles, Calif.; E. L. Shaner, Cleveland, Ohio; Charles J. Stark, Cleveland, Ohio; Penelope M. Stark, Cleveland, Ohio; E. L. Werner, Cleveland, Ohio; Grace Whelan, Santa Barbara, Calif. 3.—That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: John Hancock Mutual Life Insurance Co., Boston, Mass. 4.—That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him. Geo. O. Hays. Sworn to and subscribed before me this 26th day of September, 1944. (Seal) Shirley R. Holman. (My commission expires Jan. 20, 1946.)

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For Steel Foundry operating one acid open-hearth and one acid electric furnace, producing 700 tons of steel castings per month ranging from 1 lb. to 10 tons. Employ 20 coremakers. Located near Chicago. This is a permanent position for a competent man. Please give qualifications and salary expected first letter. Address: Box 636, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

Well established Nonferrous Metal Foundry in Milwaukee area. State age, experience, salary expected. Good opportunity for right man. Address: Box 630, The FOUNDRY, Cleveland 13, Ohio.

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Help Wanted

WANTED

Opportunity for young steel moulder to train for foreman in an old established foundry in the Northwest. State age and experience. Address: Box 660, The FOUNDRY, Cleveland 13, Ohio.

COREROOM FOREMAN

For Brass and Aluminum Jobbing Foundry. Located in Northern Indiana. Definite postwar employment. Write giving age, qualifications, experience, marital and draft status, when available and salary expected. Address: Box 654, The FOUNDRY, Cleveland 13, Ohio.

PNEUMATIC TOOL SALES ENGINEER

Old established manufacturer of Pneumatic Tools require the services of several district sales engineers. Mechanical training and experience essential. Sales experience also desirable. Those selected will be given shop training before permanent assignment to territory. Give complete record of experience and education. Address: Box 600, The FOUNDRY, Cleveland 13, Ohio.

CLEANING ROOM FOREMAN

For steel foundry—Castings up to 1500 pounds. Subject to rigid inspection. Must have good record in handling all types of labor, to get out production. Philadelphia district. Address: Box 585, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Foreman, Annealing Department, malleable foundry in Middle West. Give full particulars regarding age and qualifications. Address: Box 577, The FOUNDRY, Cleveland 13, Ohio.

ASSISTANT PLANT SUPERINTENDENT

We are seeking the services of an assistant plant superintendent for large gray iron foundry. Must be thoroughly experienced in modern foundry and machine shop practice. Proved executive ability necessary. This is a postwar position. Write: Box 674, The FOUNDRY, Cleveland 13, Ohio.

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Experienced metallurgist in gray iron, steel and malleable practice for general foundry service work. One qualified by practical experience, as well as technical training preferred. Desirable opportunity for man with proper qualifications. Give full information as to experience, education, special qualifications, references and age in your reply. Address: Box 680, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Pennsylvania Steel Foundry producer of green and dry sand castings ranging in weight from five (5) pounds to fifty (50) tons, has a permanent opportunity for Production Engineers, Rate Setters, Adjusters and a Sand Engineer familiar with mixtures and application. Address: Box 444, The FOUNDRY, Cleveland 13, Ohio.

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Positions Wanted

PLANT MANAGER OR SUPERINTENDENT

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Positions Wanted

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Twenty-five years' experience as gray iron superintendent. Both practical, technical and efficient in all departments of foundry labor relations, etc. Married, good health. Available and references. Address: Box 641, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

Malleable or Gray Iron foundry. Twenty-five years' experience in all departments. Technically trained. Address: 681 The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Positions Wanted

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Special equipment for producing automotive castings, as coreblower, all sizes steel flasks, roller conveyers, gas core oven, jolt squeeze-in draw molding machines, air rammers, cupola charger. Address: Box 659, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Tabor Abrasive Cut-off Machine. Address: WALWORTH FOUNDRIES, INC., WALWORTH, WISCONSIN.

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Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY Cleveland 13, Ohio.

WANTED

A small foundry or foundry and machine shop located in northwestern part of Ohio or northeastern part of Indiana. Reply: Box 627, The FOUNDRY, Cleveland 13, Ohio.

WANTED

New or second-hand coal, sand and casting conveyors. Address: Box 679, The FOUNDRY, Cleveland 13, Ohio.

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FOUNDRY—TO LEASE OR BUY

Small foundry—Malleable—Gray Iron or Nonferrous in the East. Will consider whether operating or not. Address: Box 589, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Foundry, small nonferrous sand mould productive type. Within 150 mile radius of Chicago. Address: Box 675, The FOUNDRY, Cleveland 13, Ohio.

Foundry for Sale

FOR SALE

Grey Iron Foundry in Central New York. In business forty years. Good postwar prospects. Will assume all present liabilities. $25,000 required. Address: Box 665, The FOUNDRY, Cleveland 13, Ohio.

Employment Service

SALARIED POSITIONS

This advertising service of 34 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Identity covered and present position protected. Send for details.

R. W. BIXBY INC.
101 Delward Bldg. Buffalo, N. Y.

GRAY IRON FOUNDRY EMPLOYMENT

We are receiving many inquiries for superintendents, metallurgists and foremen. We shall be glad to hear from qualified men. No charge.

Gray Iron Founders' Society Inc.
1010 Public Square Building Cleveland, Ohio

For Sale

FOR SALE

Booth Type 10R 1,000 pound capacity Electric melting furnace complete with all operating mechanism, control board and transformer.

An opportunity to get an electric melting furnace at a fraction of its original cost.

THE PRIME MFG. CO.
1069 S. 1st ST. MILWAUKEE 4, WIS.

AIR COMPRESSORS

BELTED—176 ft., 355 ft., 540 ft., 676 ft., 752 ft. & 1300 ft.
ELECTRIC—355 ft., 528 ft., 676 ft., 807 ft., 1302 ft., 1723 ft., 2022 ft., 2200 ft., 2800 ft., 3600 ft., & 5000 ft.

STEEL TANKS

9—5000 gal., 11,500 and 18,000 gal. cap.
17—1000 bbl., 4000 bbl. and 10,000 bbl. cap.

TANKS BOUGHT AND SOLD
R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y.

FOR SALE

Complete Sand Testing Equipment, (Harry W. Dietert make). For particulars write or call, Kelly Foundry & Machine Co., Elkins, W. Va.

REBUILT USED EQUIPMENT

Molding machines, all types; tumbling mills, furnaces; cupolas; air compressors; hoists; rammers, all types; ladles, all types; sand mixers, sand blast tanks; core machines, etc. All equipment rebuilt and guaranteed. All sizes used steel flasks.
HAYNES FOUNDRY EQUIPMENT COMPANY
1734 Lake St. Kalamazoo 21, Mich.

REBUILT
BLOWERS—FANS—EXHAUSTERS

Roots-Connersville positive cupola blowers. Centrifugal blowers for gas and oil burning. Sand blast, grinder end dust exhausters. Ventilating fans.
GENERAL BLOWER COMPANY
404 N. Peoria St. Chicago, Ill.

FOR SALE

1—Type BB 1, Size 225, Serial No. 563, Fisher Crucible Furnace, with 7 new crucibles. In excellent working condition. Call or write Kelly Foundry & Machine Co., Elkins, W. Va.

For Sale

FOR SALE

1½ Hsp. Type M 7A Strand Flexible Shaft Grinder; 8 by 1½ by ¾ Wheels; High Speeds 2500-3500-4500 RPM; 220 V, 3 Phase, 60 Cyl. AC; Mounted on 4 wheel Truck and Swivel Base with all standard attachments Like New.

2 Johnston Pressure Blowers with Motors:

(a) Size No-510 Blower with 5 Hsp. Motor, Capacity 1250 CFM 10 oz. Pressure.

(b) Size No-112 Blower with 1½ Hsp. Motor, Capacity 200 CFM, 12 oz. Pressure.

Lewis No. 7 Core Wire Straightener & Cutter Machine with GE ½ Hsp. Motor, 345 RPM, 60 cy., Capacity Up to ⅛" diameter wire 1" to 12" 220 Volt, 3 Phase; Height Over all 18¼"; long; Speed 80-6" pcs. per minute; Operate by hand or by motor.

Adams Cherry Easy Lift Off Wood Flask; Size 14 by 14 with 8½" cope, 3" Drag, 4° Taper. One ¾" Round Pin and one ¾" Hex Pin with bushing pin centers 17¾".

Nine 14" by 14" by 9" deep Cast Iron Jackets, 4° Taper; Jackets extend 1¾" on Drag, 7¼" on Cope.

Whiting Wishbone Charger & Buckets.
Modern 400" Cylindrical Ladles with Cover.

PAUL PUFAHL & SON FOUNDRY
COMO AVENUE, S. E., and CITY LIMITS
MINNEAPOLIS 14 MINN.

FOR SALE

1—No. 3—8 foot Simpson Intensive Sand Mixer. In first class usable condition. All mixing parts but mullers new. Immediate delivery. ADDRESS: STEDMAN'S FOUNDRY & MACHINE WORKS, AURORA, INDIANA.

FOR SALE

1 Cleveland Sand Cutter in perfect condition, reasonably priced, 68" cutting blades, 82" between Tractor wheels, motors 60 cycle, 3 phase, 220 volts. Address: Caloric Gas Stove Works, Topton, Pa.

FOR SALE
SPECIAL VICTORY BARGAINS

Cast Iron and Steel Plate Mill-Dust & Shavings Exhausters 50 in stock. **Cupola and Furnace** Blowers for Coke, Oil or Gas Combustion.
1—Spencer Blower 2250 C.F.M.—1½ lbs.—65 H.P. 3/60/220 or 440 A.C.
2—Sprague 4 Ton Electric Hoists 115 V. D.C.

MELTING FURNACES

2—Walker-York coke fired crucible furnaces for up to No. 70 crucibles—blowers attached.
1—US Rotary No. 3—Melting or Smelting.
1—Pair Monarch-Rockwell's—Rotating, each 500 lbs. cap. mounted together on base, oil burners available, when used together waste heat from one preheats other.
1—Hausfeld open flame, non crucible 400 lbs. brass capacity or equivalent volume for Aluminum.
1—Stationary for No. 70 crucible.
1—Booth Electric—725 Lb. Brass Capacity
Tumbling Mills—1 cast iron for brass cleaning.
1—Sly 48" x 60"—1" thick round steel shell.
Core Ovens: Small portable, insulated.
1—Blystone—7 cu. ft. capacity size sandmixer.
1—8 ft. size No. 3 Simpson (Muller type) Sand Mixer.
Molding Machines:
1—"Rapid" Portable Jolt-Squeezer, Platen—10" x 21".
1—"Herman" 60" x 70" Plain Air Jolt Table 6000 lb. lift capacity.
1—Battenfeld stationary 12" cyl. plain squeeze.
1—Arcade portable plain air squeeze 12" cyl.
1—Osborn No. 405 stationary jolt-rollover draw
1—International 26" x 36" type F jolt-rollover-draw.
1—Tabor all hand operated Portable 24" x 36" rollover, 8" draw.
Compressors:
Bury—12" x 10" modern valves—358' cap.
1—Chicago 12" x 8" 240' cap., 70 lbs.
Gardner 4½" x 4½" Vertical 19'.
Tested-air receivers—12" up to 36" dia.

CLIFTON MACHINERY CO.
1023 W. 6TH, CINCINNATI 3, OHIO

FOR SALE

Hevi Duty electric furnaces (2) crucible type, 350 lbs. capacity for holding aluminum with crucibles, transformer for 208 V., 60 cy., 3 ph. Have reservoir beneath melting chamber to collect charge in case of crucible failure. Brand new. Address: Box 538, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

For Sale

FOUNDRY EQUIPMENT FOR SALE

Moulding Machines

Knockout Machine

Sand Blast Cabinet, Large

Sand Blast Cabinets, Small, with Wet Collectors for Magnesium Castings

Furnaces

Steel Crucibles for Magnesium

Spot Welder

Air Presses

Paddle Type Mixer. Hot or Cold

Barrel Type Mixer

Abrasive cut off Machines—Two, one new

All items offered subject to prior sale, F.O.B. Detroit. Replies should be directed to the Corporation addressed 1400 Lafayette Building, Detroit, attention of Purchasing Dept.

BOHN ALUMINUM & BRASS CORPORATION
1400 Lafayette Building **Detroit 26, Mich.**

FOR SALE

Magnesium and aluminum foundry. This is an established and extremely profitable concern located in the St. Louis area.

Magnesium production exceeds 30,000 pounds per month. Aluminum approximately 15,000 pounds per month and capable of very great expansion.

Abundant labor supply—both skilled and unskilled.

Contracts on hand exceed three-quarters of a million and growing.

Complete operating and managing personnel well trained and on reasonable salaries.

Ill health of one partner and many diverse interests of the other make this sale advisable.

This is an extremely interesting proposition in view of the excellent postwar prospects of this shop.

BOX 668
THE FOUNDRY **CLEVELAND 13, OHIO**

EQUIPMENT FOR SALE

2 Used "Milwaukee" Portable Jolt Strip Squeeze Molding Machines, Type 113, Max. Pattern Draw 6", Max. Pattern Length 24", Max. Pattern Width 13½", Jolting Capacity 500 lbs., Platen Size 12" x 14".

2 Used "Milwaukee" Stationary Jolt Strip Squeeze Molding Machines, Type 142, Max. Pattern Draw 6", Max. Pattern Length-Open End, Max. Pattern Width 16", Jolting Capacity 1200 lbs., Platen Size 14" x 16".

1 Used "Grimes" 32" x 48" Power Rollover Molding Machine.

1 Used "International" Manually Operated 36" Diam. Strip Molding Machine, Type W.

1 Used "Nicholls" 20" x 36" Jolt Squeeze Strip Molding Machine.

1 Used "Pioneer" Rapid Plain Squeezer Portable Molding Machine, Type R4, Bench Plate 21" x 14", Head Plate 14" x 8".

1 Used "Modern" 1 Ton Bottom Pour Worm Geared Crane Ladle.

1 Used "Pfeiffer & Smith" Sand Mill with 60" x 12" pan Sand Mixer.

12 Used "Thor" Scaling & Chipping Hammers, Size 001.

Grede Foundries, Inc.
P. O. Box 443 **Milwaukee 1, Wis.**
Telephone: Mitchell 2450

INDUSTRIAL MELTING FURNACE

1—No. 150/225 Tilting Crucible Coke Furnace for ferrous and nonferrous metals with Motor Blower attached. Prompt delivery. Address: The Harvey Furnace Co., 2935 St. Paul St., Baltimore 18, Md.

FOR SALE

For want of use, one Dust Arrestor from Tabor Cut-Off machine, also one Foot Power Sprue Cutter. Both articles new. Address: COCHRANE BRASS FOUNDRY, YORK, PA.

FOR SALE

One second hand Stedman Type "B" 24" x 20" Rolling Ring Crusher with Chilled Liners, Manganese Rings and Cage Bars, Cast Iron Construction. Also one second hand Stedman Type "B" 24" x 20" Rolling Ring Crusher arranged for flat belt drive, all steel construction, having cast steel housing and liners. Machines in good operating condition and may be inspected at our plant.

BIRDSBORO STEEL FOUNDRY & MACHINE COMPANY
BIRDSBORO, PA.

FOR SALE

WELDING, CUTTING EQUIPMENT. Torches, Regulators & Gauges, Aircraft Welding Outfits and Torches, Lead Welding Outfits and Torches, Soldering Outfits, Acetylene Generators, Supplies, Electric Arc Welders, Electrodes.

SUPERIOR OXY-ACETYLENE CO.
HAMILTON, OHIO

PRICED RIGHT FOR QUICK SALE

Stedman Heavy Duty Type "B" NIFE-Less Hog (Crusher for Reducing) 24 x 20", cap. 2 to 2½ tons per hr., 21 x 21" hopper.

Irving Schwartz
Sales—Liquidations
USED—RECONDITIONED FOUNDRY & INDUSTRIAL EQUIPMENT
327 S. LaSALLE ST. R 1537—CHICAGO 4

CENTRIFUGAL COMPRESSORS

7000 CFM, @ 1¼ lbs. pressure, Ingersoll-Rand type F S, driven by a 60 HP, Westinghouse 220/440 volt 3600 RPM motor.
2100 CFM @ 12 oz. General Electric with 10 HP 220/440 volt 3450 RPM motor.

Pressure Blowers

(2) 1200 CFM @ 11 oz. Buffalo, 9½" intake, 7" x 7½" outlet, with 7½ HP 3/60/1800 RPM motors.

THE MOTOR REPAIR & MFG. CO.,
1552 HAMILTON AVE., CLEVELAND, OHIO

For Sale

REBUILT EQUIPMENT IN STOCK
IMMEDIATE SHIPMENT

(2)—¾" Cap. Power Sprue Cutters.
(1)—10" Tabor Post Type Squeezers.
(2)—Heavy duty double end U.S. Elec. Grinders, 440-V.-3-PH-60-CY. Cap. (2) 20 & 4" wheels.
(1)—Pangborn type G.D. size No. 3 Sand Blast Barrel.

ELECTRIC MONORAIL HOISTS

Cap.	Make	Current	Remarks
(2)—1	Euclid	115-VDC.	Single Speed
(3)—1	Shepard	230-VDC.	Var. Speed
(3)—2	Shepard	230-VDC.	Var. Speed
(3)—2	Shepard	230-VDC.	Two Motor
(1)—3	Shepard	220-VAC.	Two Motor
(1)—4	Shepard	230-VDC.	Two Motor

SPECIAL: 2—1-ton Shepard Hoists, arranged for stationary mounting, 7½-HP. motor, 220/440-VAC. Var. Speed separate controller, 32-ft. of cable, suitable for use as winches, car puller to operate furnace doors to elevator.

SPECIAL: 2—7-ton Shepards, Fl. or Cage Operated, 230-VDC. 20-HP. hoist motor, 28/70-FPM. 10-HP. trolley motor, 300/400-RPM. 40-ft. lift.

AIR COMPRESSOR

(1)—9 x 8 Chicago, N.S.B. cap. 178-CFM. @ 100 lbs. with 25-HP. 220/440-VAC. motor and control.

BUCKETS

(1)—¾-yd. Hayward Electric 220-VAC.
(2)—1½-yd. Hayward Electric 230-VDC.

OVERHEAD ELECTRIC TRAVELING CRANES

Tons	Make	Span	Current	Remarks
(1) 2	Shepard	30'11"	230-VDC.	FL.OP.
(1) 3	Shaw	30'0"	230-VDC.	FL.OP.
(1) 4	Shepard	30'11"	230-VDC.	FL.OP.
(1) 5	Niles	24'0"	220-VAC.	FL.OP.
(1) 5	Box	40'0"	A.C. or D.C.	CG.OP.
(1) 10	Bedford	48'0"	230-VDC.	CG.OP.
(1) 10	Whiting	80'0"	220/440 VAC	CG.OP.
(1) 15	Morgan	52'3"	230-VDC.	CG.OP.
(1) 20	Northern	64'0"	220-VAC.	CG.OP.

WE OWN AND HAVE ALL THIS EQUIPMENT IN STOCK, IT IS OFFERED REBUILT IN OUR LARGE MODERN PLANT AND FULLY GUARANTEED.

T. B. MACCABE CO. **4300 CLARISSA ST.**
PHILADELPHIA 40, PENNA.

FOR SALE

ONE RANSOHOFF MILL

Side loading, side unloading tumbling mill with pump, tank, 2 HP motor and reversing switch. Mill is 48" long x 30" diameter and was used only short time. Reason for selling: Have outgrown its facilities. Priced right for quick sale.

GOULDS PUMPS, INC.
SENECA FALLS, N. Y.
ATTENTION: T. V. BALDWIN

FOR SALE

Sixteen International Special Type GJ hand ram, power turnover, foot draw, molding machines; equipped with two 1" Branford vibrators on each machine. Will take corebox 24" wide, unlimited length. Precision built machines for close aircraft work. Good operating condition, priced to sell. **ALUMINUM CO. OF AMERICA, 3311 DUNN ROAD, DETROIT 11, MICHIGAN.**

FOUNDRY EQUIPMENT FOR SALE

1—McGill & Co. 6 ft. Sand Grinding Mill, 48" x 14" Cast Steel Mullers, Cast Steel top Bevel Gear Drive, Cast Iron Frame, Driven by Crocker-Wheeler 20 H.P., 220 V., 775 R.P.M. D.C. Motor. May be inspected at our Vandergrift Plant, where it was originally installed in 1910. Book value of mill $3,750.00. Book value of motor $550.00. Equipment in good condition and in addition to foundry work could be used for grinding gannister in a steel plant. A new pan, never used, goes with the mill. Weight of mill including motor 36,300 lbs. Sale price $1,000.00 f.o.b. Vandergrift, Pennsylvania.

UNITED ENGINEERING AND FOUNDRY CO.
FIRST NATIONAL BANK BLDG.
PITTSBURGH, PA.

SCULLY Reconditioned Foundry Equipment

★ ALL SCULLY EQUIPMENT IS REBUILT AND OVERHAULED IN OUR OWN MACHINE SHOP

MOLDING MACHINES

JOHNSTON & JENNINGS

Jolt Roll-Over Draw Machines

No. 610, 24 x 30" table, 600 lbs. cap. @ 80 lbs. press., 10" pattern draw.

No. 815, 30 x 40" table, 1200 lbs. cap. @ 80 lbs. press., 15" pattern draw.

No. 918, 40 x 48" table, 2000 lbs. cap. @ 80 lbs. press., 18" pattern draw.

MISC. MOLDING MACHINES

No. 112 Arcade portable jolt roll-over and squeeze, pattern draw, table accommodates pattern plates up to 13 x 33"—9" draw, distance between uprights 36".

No. 28 Davenport jolt roll-over draw, 26½ x 39½" table-pattern draw 12"—jolt cyl. dia. 8"—1500 lbs. cap. @ 80 lbs. press.

Pridmore 30 x 42" power turn-over and drop Electrically operated 24 x 32" jarring machine, 2 HP 220V AC Motor.

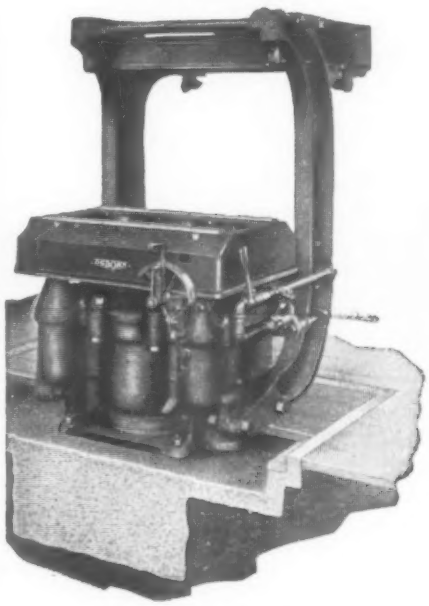
PLAIN AIR SQUEEZERS

Tabor stationary, 32" between rods, 13" dia. cyl. 18 x 24" table.

Davenport, 33" between rods, portable straddle type, 10" cyl. 14 x 20" table.

Tabor, portable, 32" between rods, 10" dia. cyl 16 x 17" table.

OSBORN JOLT SQUEEZE & POWER STRIP



No. 703 OSBORN

(Similar to above excepting with roll-off)

No. 703-6 Osborn jolt squeeze and strip, 21 x 28" table, stationary. Length of opening in lifting frame 34", 6" pattern draw, 8" cyl. dia. 1000 lbs. jolting cap. @ 80 lbs. press. Distance from lifting frame to squeeze head 24¼", flask length 44½" with roll-off conveyor.

No. 703-5 Osborn, same as above, excepting 17 x 35" table.

PLAIN JARRING MACHINES

60 x 60" Tabor, 14" dia. cyl. 8500 lbs. cap. @ 80 lbs. press.

42 x 60" Tabor, 13" dia. cyl., 7500 lbs. cap. @ 80 lbs. press.

JOLT SQUEEZE STRIPPERS

No. 113 Milwaukee, open end type, portable, 500-lbs. cap. @ 80 lbs., 6" draw, 16 x 35" table.

Osborn No. 82 STRIPPING PLATE JOLT SQUEEZER, 46" between rods, 10" draw, 1200 lbs. jolting cap., 1000 lbs. stripping cap., 24 x 36" table pin lifts 12" part one way, 36" the other.

Nicholls Type "D" stationary heavy duty, JOLT SQUEEZE & PATTERN DRAW, squeeze piston 14", jolt piston 6", draw 2-6"—distance between strain rods 40" take approx. 15 x 24" flask.

JOLT STRIPPERS

International Type T.J. 30" x 30" with 10" draw.

Osborn 550-22 Pit type jolt strip fixed pin centers—16" x 32" table 32" x 36".

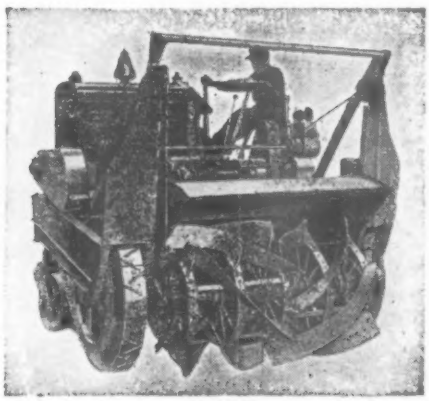
Osborn 550—Pit type fixed pin centers 16" x 26" table 17" x 36" capacity 750 lbs. 12" lift.

Osborn 560—Pit type adjustable pins—table 30" x 48".

AMERICAN SANDCUTTERS

Cleveland-American (similar to Model "K" 84" spiral cutting cyl., 36" dia., 92" between tractor wheels 5" face, 6' dia.—equipped with Cleveland 3-phase 60 cycle 220V AC Motors, Cable and Take-Up Reel.

American Model "CP" size 72, having 72" cutting cyl., 90" between tractor wheels, tractor wheels 50" dia., 5" face, equipped with Hercules Gas Engine.



POSITIVE PRESSURE BLOWERS

No. 4 Roots, 14 x 48" — 13 ft. displ. 14" top discharge, pulley drive.

No. 5½ Roots, 18 x 63"—18" dia. top discharge arranged for motor drive with Link-Belt Chain (without Motor) on CI base plate.

No. 5½ Roots (High Pressure) 18 x 42½"—18 ft. displ.—2 lbs. press., belt drive, top discharge.

No. 6 Piqua, 21 x 60" — 35 ft. displ. 20" top discharge, single gear, mounted on bed plate (without motor).

CUPOLA CHARGING CRANE

1—Shepard 3-Ton Cap. 3 phase 60/220 Volt Cupola Charging Crane Cab Operated.

MAGNET

1—24" Dia. Cutler-Hammer Magnet 220V DC.

OVERHEAD ELECTRIC TRAVELING CRANES

10-ton approx. 30'7" span, 3-motor type, Northern Electrical 115 V. DC Motors, Hoist 15 HP 750 RPM, Rack 3 HP 1200 RPM, Bridge 7½ HP 950 RPM, EC&M Controllers, cage oper., 24" double "I" Beams, cast iron truck ends, chain lifts.

1-ton Euclid 1-motor single "I" beam girder hand operated CRANE, equipped with Electric Hoist 3/60/440 V. AC Motor, approx. span 30 ft.

1-ton Detroit Type "H" Lohed Room, approx 29 ft. span, 12" double "I" beam girders, 9 ft. lift, floor control Watson Induction Type "KH" 3/60/220 V. AC Motors, approx. 40" clearance.

3-ton MILWAUKEE 3-motor Type "C" GANTRY CRANE (suitable for 5-tons) 230 V. DC Motors, lattice type girders, structural end trucks, enclosed cage at one end, approx. span 31'6", lift 25 ft. overhang each side approx. 12 ft., single drum parallel with bridge girders, including ½ yd. single line perforated BUCKET for same.

HOISTS

1-Ton Shepard equipped with 220 V DC Motor.

Detroit cable type air hoist 1000 lbs. capacity, 10 ft. lift spread 18 ft. per minute.

Detroit 5 ton cable type air hoist—12 ft. lift @ 15 ft. per minute.

ELECTRIC BUCKETS

2-Yd. Hayward ELECTRIC COAL BUCKETS equipped with Shepard Hoisting Unit, 10 HP, 230V DC Motor.

1½-Yd. Hayward Elec. equipped with Class "B" 6 HP 230V DC Electro Dynamic Motor—Hoist Cap. 8000 lbs.

1-Yd. Electric—equipped with D.C. Motor. dim. when closed 50" width, 72" length.

MISCELLANEOUS

Hausfeld Style 1000, 100# cap. stationary ALUMINUM FURNACE, with cast iron pot, gas-fuel oil.

No. 27-D Excelsior Single Spindle AUTOMATIC GRINDING AND POLISHING MACHINE, grinding cap. up to 60" sq., pulley drive (floor space required 9 x 12 ft.)

SCULLY MACHINERY & EQUIPMENT CORP.

2031 WEST 74th STREET (Phone PROspect 8770) CHICAGO 36, ILLINOIS

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4 HIGH VOLATILE MATTER

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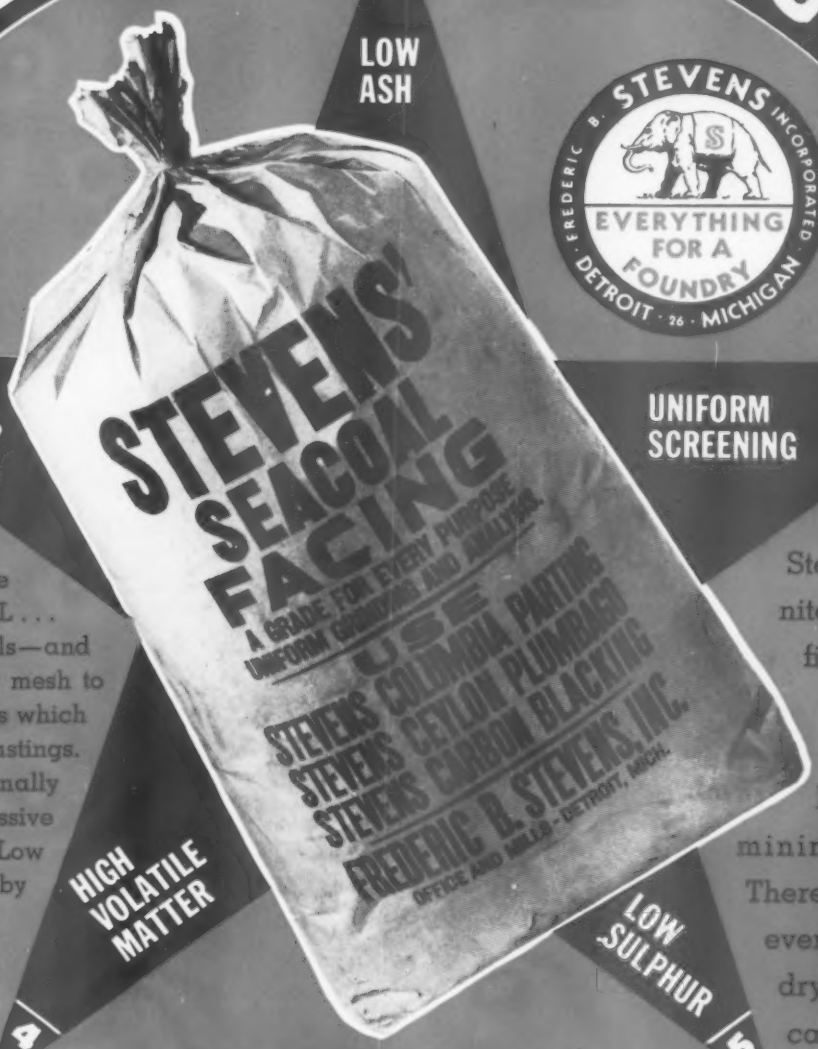

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SELECTION OF COAL

Stevens Seacoal is made from the best grade of WEST VIRGINIA COAL . . . ground in our own Mills—and screened through proper mesh to eliminate coarse particles which cause coke-pitting on castings. ASH content is exceptionally LOW—eliminating excessive contamination of sand. Low sulphur reduces pickup by the metal. HIGH FUSION POINT OF ASH is another important feature of Stevens Seacoal.

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Stevens Seacoal definitely improves casting finish—aids in peeling sand from metal surfaces. Thus, better castings—minimum of cleaning. There is a grade to suit every variation of foundry requirements. You cannot buy a better Seacoal!

USING THE RIGHT GRADE

The four grades of STEVENS SEACOAL give a wide range of grain sizes. To maintain good permeability of facing sand, we recommend that you use a grade that closely matches the fineness number of the molding sand it is to be mixed with. The more thoroughly Seacoal is mixed with the facing sand, the better the results obtained.

SEACOAL AND SAND CLASSIFICATION

GRADE "B"—For very heavy castings. A. F. A. Fineness No. 85.
GRADE "C"—For medium castings. A. F. A. Fineness No. 120.
GRADE "D"—For medium to small castings and for malleable and radiator work. A. F. A. Fineness No. 162.
GRADE "E"—For small castings and ornamental work, where very fine sand is used. A. F. A. Fineness No. 187.

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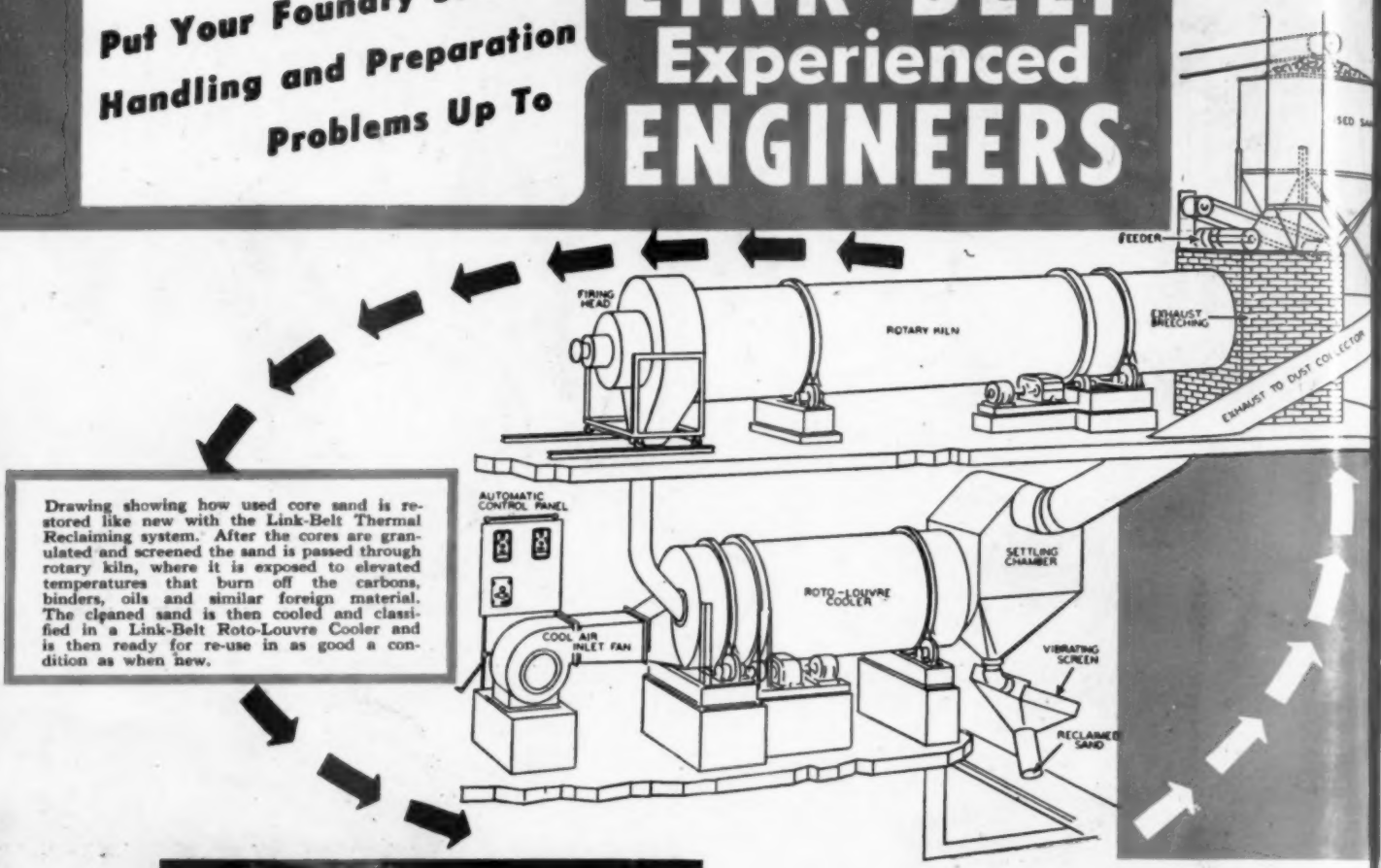
Put Your Foundry Sand Handling and Preparation Problems Up To

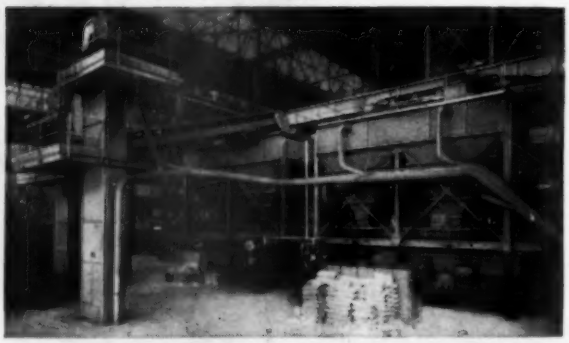
LINK-BELT Experienced ENGINEERS



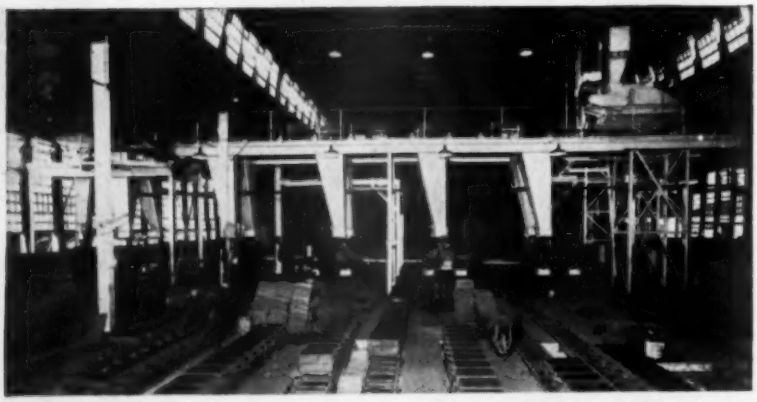
Drawing showing how used core sand is restored like new with the Link-Belt Thermal Reclaiming system. After the cores are granulated and screened the sand is passed through rotary kiln, where it is exposed to elevated temperatures that burn off the carbons, binders, oils and similar foreign material. The cleaned sand is then cooled and classified in a Link-Belt Roto-Louvre Cooler and is then ready for re-use in as good a condition as when new.

Catalog on Request

Catalog on Request. Ask for Book No. 1839-B. It will stimulate thoughts and ideas in respect to the production of better castings while effecting a cost reduction.



This Link-Belt sand preparation and handling system not only relieved foundry congestion, promoted good housekeeping and made scientific sand control possible, but also enabled the foundry to obtain greater production at lower cost and make better castings.



Production was stepped up at this foundry, not by building a new plant, but by replacing floor type hand methods with Link-Belt mechanical sand handling units, thereby making it possible to produce better castings in greater volume within the same floor space.

● Profit by their vast experience—in mechanizing large and small foundries of all types the country over. Send for information on these phases of sand preparation and handling equipment:

- √ Centralized Mechanical Shakeouts
- √ Sand Reclamation Units
- √ Screening and Riddling of Shakeout Sand
- √ Sand Storage Bins and Feeders
- √ Aerating and Fluffing
- √ Sand Preparation
- √ Distributing Conveyors
- √ Mold and Castings Conveyors
- √ Elevators and Conveyors of All Types
- √ Roto-Louvre Heat Dryers & Coolers
- √ Power Transmission Machinery

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